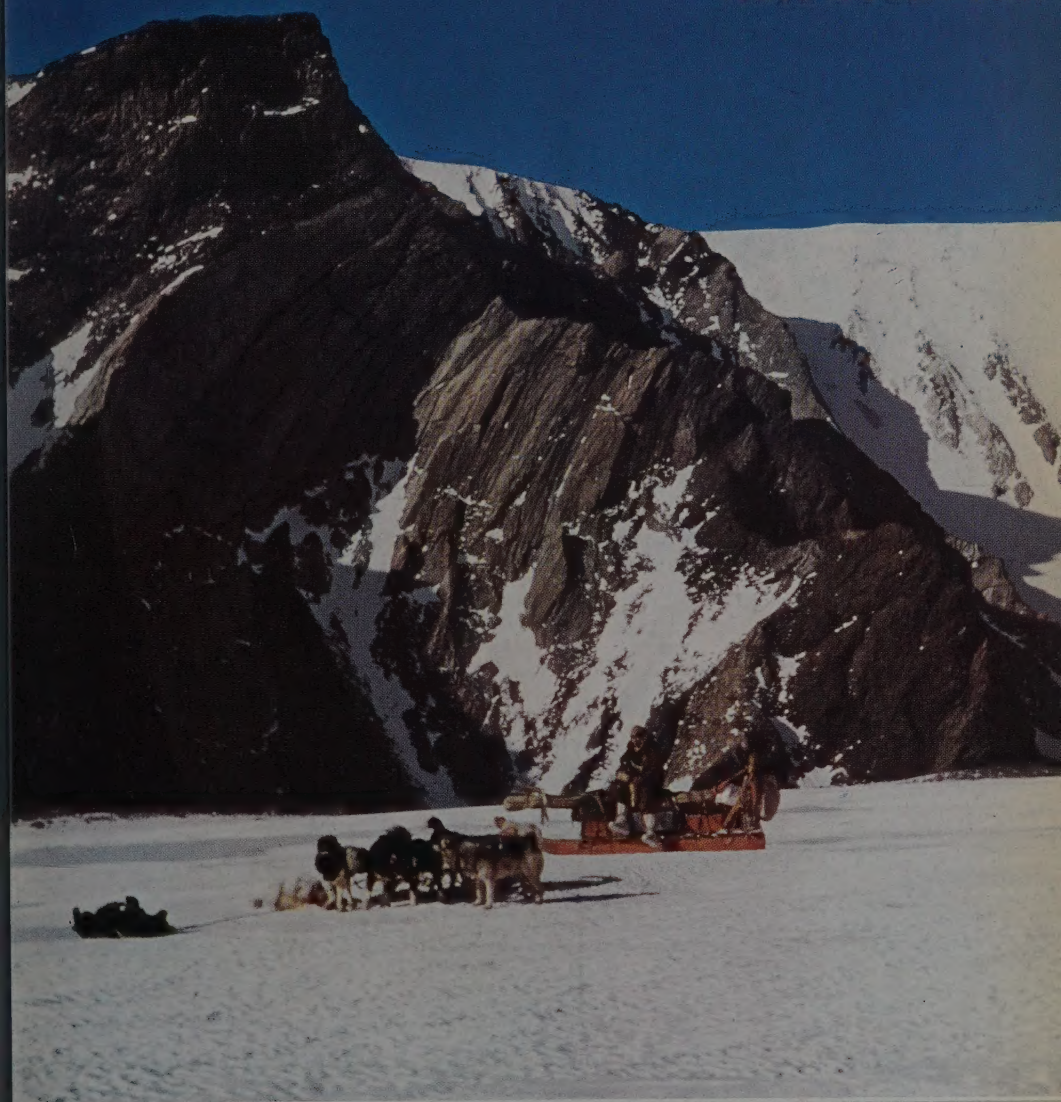


*The* **JUNE 1955 2/6**

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# Among the Pygmies

by NOËL BALLIF

*The following passages are extracted from the book Dancers of God, just published by Sidgwick and Jackson. The author, a producer of documentary films, included three such films of life among the Pygmies and other tribes of the Middle Congo in French Equatorial Africa in the results of his expedition, which comprised also two anthropologists, a geologist and various technicians*

ALEXANDRE DJAMBABO sat before me on a little stool carved from a single piece of timber; we were in front of his house. He was a young man, dressed in khaki shirt and shorts; he was clerk to Motozélé, the Pomo headman. (The Pomos are the non-Pygmy Africans of the Middle Congo.) The walls of his house were decorated with pictures copied from a "dissionnaire"—an elephant, an antelope, a hippopotamus and a rhinoceros, interspersed with stylized trees. The rhino he had never seen, for there are none in the region. By the door he had imagined a Pygmy in pursuit of a gorilla. The silhouette of the hunter was beautifully executed, tiny beside the great ape.

Having taken down the first words of the Pomo vocabulary I was compiling on behalf of the Institute of Ethnology, I next asked Alexandre to dictate to me some of the proverbs of the Pomo. I wrote them phonetically, noting the translation word for word. "The bee took counsel from the fly" (It is no use asking advice from a lunatic). "The egg does not betray the bird" (The son is faithful to his father). For two hours I questioned him, then we went to Motozélé's home.

Motozélé's hut was set back from the rest, and surrounded by four others: one each for his three wives, one for his mother. Motozélé and his uncle, an old man still wearing the traditional woven loincloth, were eating outside with Logoué, the local 'constable', his face still painted in its ritual stripes because of the panther he had killed. Alexandre sat down before a big bowl of rice and another in which floated portions of fish in a thick orange-coloured sauce of palm-oil. The manner of eating was to roll a small ball of rice, dip it in the sauce and swallow it, finally dipping the fingers into a bowl of water carried round by Motozélé's eldest son.

Everyone seemed to be busy in the camp. Hartweg continued his measuring of everyone he could find; he also took from each a drop-sample of blood to compare its grouping with those of the other Africans. Jacques made use

of Hartweg's anthropological activities to film the short sequence of Pygmy faces which we had in mind as an opening for our film.

Jeanne, the wife of Alexandre, came in from the plantation carrying maize, which she laid out to ripen in the sun. Three Pygmy women were doing the same thing. The harvest had been good, the rains neither too spare nor too abundant. Alexandre explained to me—indicating the Pygmy women—that when the Babinga were in the base camp Motozélé required of them a certain amount of work in the fields, in return for which he gave them part of what they gathered. (The Babinga, "the hunters", is the generic term used by the local Africans for the Pygmies.)

"But you see, Monsieur Noël—with us it is difficult; even if you have the Babinga, you are not their master."

"How?"

"Why, you will see with these ones. With the meat, too—when you have the Babinga they give you gazelles and you give them spears and axes and knives. And then sometimes they do not give the meat."

"Has that ever happened?"

He counted on his fingers. "Yes, four months ago, there was a big camp of a hundred and fifty Babinga here; they belonged to Mambiko, the uncle of Motozélé. Well, there was a lot of trouble over the meat. The uncle wanted a lot and the Babinga didn't want to give it. Mambiko started to take back the axes and knives, then one day the people were all gone. They are still all gone, in the forest far away, at Ikilemba."

"But who was right in this business?"

"Right?" he seemed surprised, "Mambiko gives axes to the Babinga, they give him meat—but nobody is obliged to do anything. That is how it is, if you have Babinga you are still not their master. They have not got any master."

Clearly there was one sanction the Pygmies could always use against their "patron"—there is no real word to describe the Pygmy-African relationship—that of vanishing into

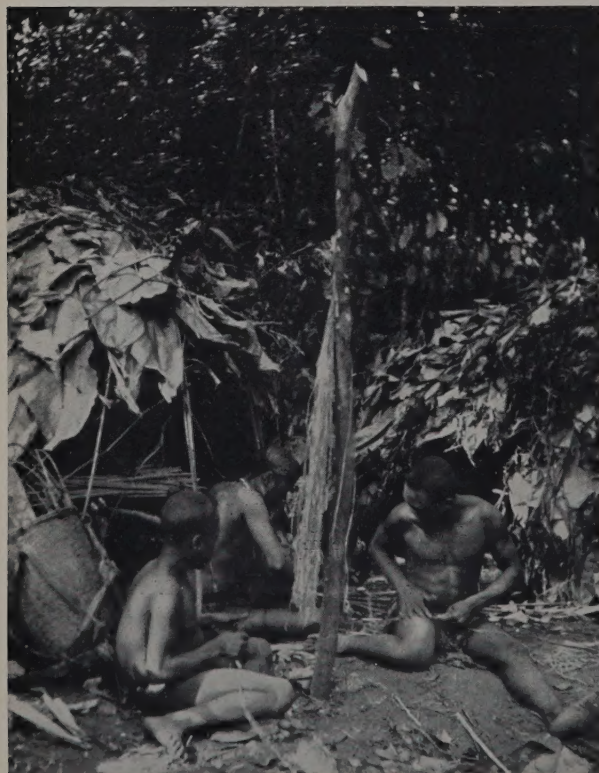
the forest whenever they wanted to.

Next I made him tell me, word for word, the famous story of the antelope and the tortoise, "Adieno baue Kouli". I took it down—literally, in my phonetic version of Pomo, and then in translation. It went like this:

"They argued the matter, and competed, and so the tortoise took all her children and dispersed them at intervals throughout the forest. So the antelope and the tortoise began the race, and the tortoise quickly hid. The antelope galloped by, and called out. A little tortoise called a reply. The antelope called again, and another tortoise-child called a reply. And thus onwards. The antelope galloped on desperately; there was always the tortoise calling 'Come on!' And so the antelope tripped into a hole and broke her neck, saying, 'At least I am strong.' In such a fashion she died by her own strength, and the tortoise and all her family went home."

Alexandre finished, and I asked for more.

*Pygmies in front of their leaf-huts; they use long liana fibres to spin the cords with which they make hunting-nets*



A. Didier

"Oh, yes, Monsieur Noël, we could have the story of the Parrot and the Foolish Man, but it is very long; it is for another day. We must go and find the drummers with the Babinga."

"The drummers?"

"For tonight's dancing. When the Pomo dance, they borrow the Babinga's drums. We give them rattles and bells."

"Don't the Pomo make drums?"

"Not now. Once—not so long ago—they made drums too."

The young men were now drumming, one with his hands, another with drumsticks, and the men were dancing among the circle of women. Motozélé joined us, together with Logoué, who had abandoned his shirt and shorts so that he could show his torso striped with white lines, his limbs daubed with clay; he wore the traditional Pomo dancing headgear: a tuft of parrot feathers in a semicircle. He told me:

"Now it is Djoboko and Django together; the men and the women dance at the same time."

"But those are Babinga dances!"

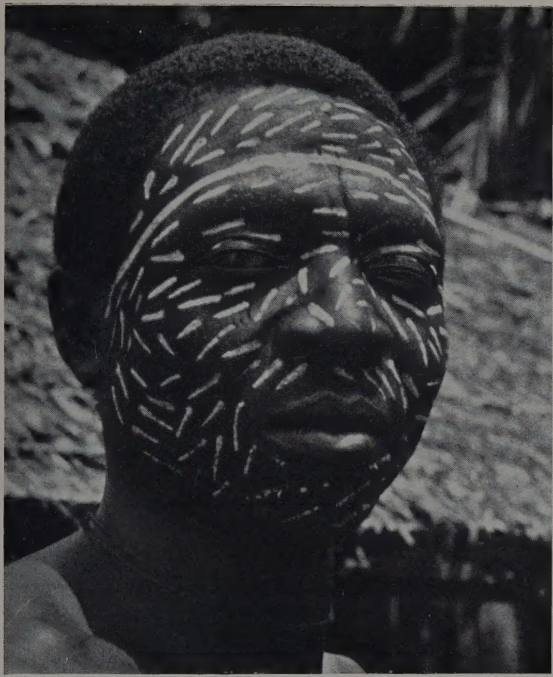
"Yes, they taught them to the Pomo."

After half an hour of this, during which my eyes strayed restlessly though my ears remained tuned to the sounds, there appeared a young man in a wooden mask, the vaguely human aspects of which were surmounted by a pair of curved horns. He moved among the dancers. Alexandre murmured:

"It is Ndiba Ndiobata: the goat mask. When it is taken by someone the dance is over. . ."

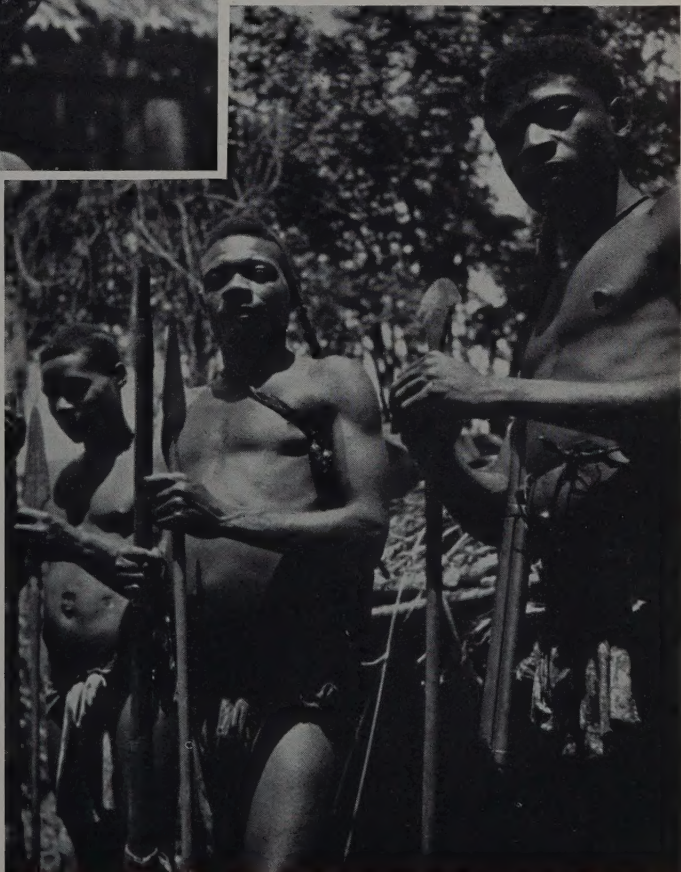
And at that moment some men arrived with a litter. The drums and bells rang out; they bore away the mummer to a hut. Motozélé shook hands with us and retired, but the festivities were by no means finished. All the population, women and children too, gathered round the musicians, who abandoned their drums for rattles of basketwork—the *bwe-bwe*. A long chanting line of dancers, nodding and shaking, began to surge through the village, to the accompaniment of a random, imaginative chorus from the singers. Then, under the pale light of the moon, they one by one





(Left) *Logoué*, the local 'constable', with his face painted according to custom after killing a panther. The Pomo, the non-Pygmy Africans of the Middle Congo, wash their bodies, and rub them with a burnt stick, and blacken their faces and apply streaks of white when they have killed an animal. These ritual markings are worn for different lengths of time according to the animal shot: a week for a panther, ten days for an elephant or an antelope. The male relatives eat the panther and parts of it, notably the whiskers, are used for 'medicines' or spells. (Below) Pygmies, armed with ancient guns, from which they fire spears: a most effective weapon, even against gorillas

All remaining photographs by the author



returned to their huts; the singing died away into a murmur of pleasantries and conversation, died away further, died away as the village drifted into sleep.

It was nearly October; in a week our time would be up, and it would be back to Brazzaville. Hartweg and Didier would have to return to their studies; the *Musée de l'Homme* for the one and the *Conservatoire* for the other. The rains had already begun; filming was interrupted sometimes for two or three days at a time.

Then the Pomo gorilla-hunter, Bakouélé, arrived, and Alexandre brought him to our hut. I shook his hand—it was a strong confident hand, matching his broad shoulders. He was short and wide, with a round head on a thick neck, watchful eyes. His French was not easy, so Alexandre interpreted: "He says: he is very strong and very artful. He is going into the forest after gorillas. He says you give him a gun."

Pierre, who was nearby, reached a musket from the wall and showed Bakouélé the working of the breech. Bakouélé examined it carefully. Then he said: "Good gun. I find gorilla, him finish."

It seemed, said Alexandre, that he was leaving before sun-up next morning, perhaps for two days, or perhaps four, or perhaps three: "He doesn't know how long."

We said we would gladly wait . . .

We had filmed the dances; we now had to record the sound for them. Rouget and André established the microphone among the chorus, and called for silence throughout the camp. A baby began to cry; hurriedly the mother put it to the breast. Silence again. "Okay," said Rouget, "Let's go."

The drums began to throb. The first cries of the Ebandja, the stirring of the fight; it made three quick and lively takes. We started again—the deep voice of the men, superimposed on a quickening of the drums; the trilling of the women; we took it all on the machine and then, once again, played back for the performers. They showed no surprise; impassively they listened—until Didier contrived at last to capture their interest by raising and lowering the volume, causing their voices to rise and fall. This they took to be genuine magic: the power of the machine to capture their voices, and cause them to sing loudly or softly at its command.

We sat them down again and tried them with some of the records we had brought. First we gave them a toccata and fugue of

Bach, which began by impressing them and finally utterly disconcerted them by its endless variations on the fugal theme, by its multiplicity of organ-tones, by its combination of both at once. This sort of architectural music was not built to seduce Africans; they preferred Chopin waltzes, with their basic rhythms, their distinctive piano notes not too distantly removed from their experience with the local xylophone.

Finally, when the Pygmies showed no sign of going to bed, Didier announced: "Now you'll hear a really fine song," and from the machine came the voice of Ninon Vallin singing Grieg, Solveig's Song. The Pygmies were visibly charmed by this; smiling, they listened with acute attention, unmistakably straining to grasp the nuances. Obviously the purely vocal music touched them most closely; they have no other type themselves; this patently gave them genuine pleasure.

Their enthusiasm, however, knew no bounds when, at the end of the record, Didier announced very naughtily: "That lovely lady who sang so beautifully, that is my wife." From then on, in the eyes of the camp, his prestige was unchallengeable.

Next day, while we were eating, Alexandre hurriedly arrived and announced: "Bakouélé is back! He's asleep now, but he got his gorilla. It's wicked. It's enormous."

"Where is he now?"

"The men have gone for him. This afternoon the gorilla will be in the village."

"But why didn't you tell us sooner? We could have gone with them."

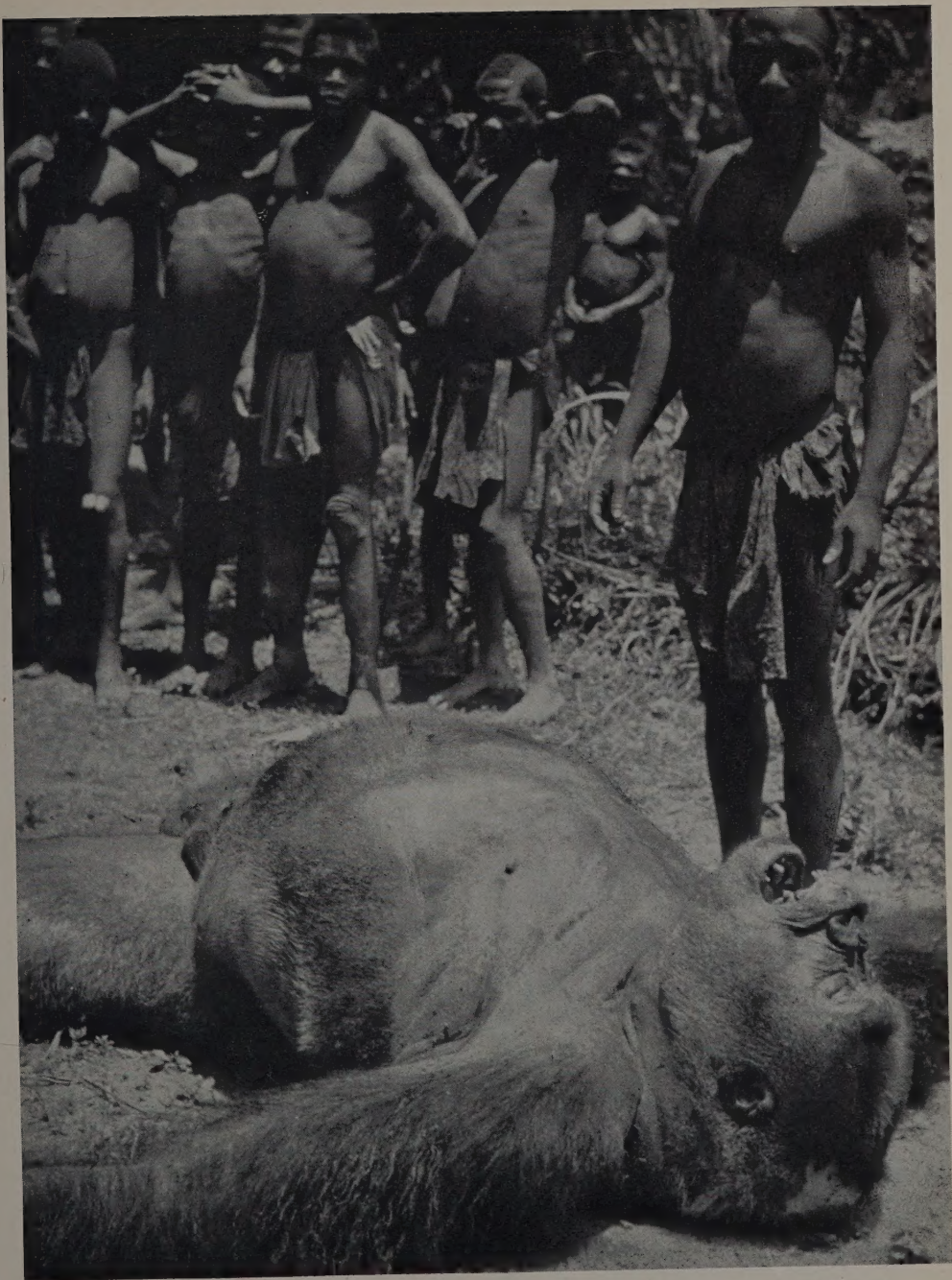
"Look, Monsieur Noël, the sun is hidden. No photographing in the forest. The gorilla comes to the village—maybe it's fine tomorrow, everyone glad."

I hoped that Jacques would be. He had gone to Ouessou to prepare for our departure. We would have wished for something better, but to film living gorillas needed resources we did not have, nor did we have the permission to capture one ourselves. Our consolation was that the weather had been so bad we could not have photographed the actual capture anyway.

This is what had happened.

When he left us, Bakouélé spent the night at Gatongo, in the hut of Alexandre, and before sunrise he was on his way again, shivering in his thin cotton shirt. He slipped on his leather holster of provisions, and, his gun in his hand, made his way into the forest, over the dead waters of the marsh. He knew where the old gorilla was that he had sought before.





*Dangawé, the Pygmy hunter, recounting to members of his tribe how he shot the gorilla*

Throughout the day he wound in among the tangle of well-known lianas to the old gorilla's lair; it was abandoned. He followed the trail—all day he followed it, and when night came he threw up a rough shelter, lit a fire, ate a handful of manioc and slept.

Again he rose before the dawn, sluiced his face in the stream, swallowed some water and moved on. Midday came, and still no gorilla. He decided to return to the village. He crept unseen back into Gatongo and hid in Alexandre's house, for Alexandre would keep quiet.

The next day he moved into another part of the forest, already flooded by the heavy rains. After an hour or two Bakouélé paused to rest at the foot of a cotton-tree, and lit half a cigarette, thinking of the dress he could buy for his wife, if this white man's commission turned out well. He checked the mechanism of the gun, loaded it.

Then he heard the noise. Someone was approaching through the bushes. Bakouélé raised his gun—the leaves parted, and there was Dangawé, one of the Pygmies, smiling, two yards away.

"M'bote."

"M'bote."

The greetings were brief, the explanations too. The Pygmy had decided to join the chase, and had brought with him one of the two ancient guns which the Babinga held communally. If he could help kill one of the great apes that the white men seemed to want to film, he knew he would get his photograph taken too, and a present into the bargain.

In single file they moved on, careful not to crack the branches or rustle the leaves. Dangawé went ahead; he was familiar with the trails among the marshlands and the corridors between the dense underbrush. Neither spoke.

Suddenly, just as they passed the foot of a vast cotton-tree, they heard a deep growling. Without any conceivable doubt, a gorilla—and then, in a flurry of crashing branches, there it was, fifteen yards away, the great semi-human mass, matted with long, dark hair.

Bakouélé had just time to raise his gun and fire. There was a howl of anger; the gorilla was hit in the shoulder. He rose to his full height, enormous; he rubbed his wound and gritted his teeth, and then he stumbled forward, beating his huge chest with his one good arm.

Bakouélé knew that from that moment on there was no escape for the creature. He and Dangawé had time to hide behind a line of

bamboos—just as another long guttural cry came from some distance off; certainly the pursuing mate of the wounded male. With-out hesitation the gorilla half turned and disappeared.

Dangawé had loaded his gun—his old gun of the First Empire. Charging it with black powder, tamped down with the haft of his spear, he added a plug of dry fibres and finally loaded it with his spear which he used as projectile. Bakouélé, hidden behind a great tree, waited, while the loud complaint of the wounded beast echoed in the undergrowth. Dangawé, watching, saw Bakouélé raise his hands to his mouth and himself utter a long cry of pain. He appreciated the ruse; this would bring the gorilla back to the defence of what he took to be his mate. And in a moment they heard his breathing, and saw his grotesque mask among the leaves.

Bakouélé fired. The bullet grazed the gorilla's ear; he advanced, roaring. He was only ten feet away, and Bakouélé tried to reload, but the animal was upon him. Suddenly a hollow detonation echoed through the trees, and in the cloud of smoke that followed he saw the monster stumble, a spear projecting from his stomach; Dangawé's spear.

It had been ten minutes since the first growl of the gorilla. Now he lay there, face downwards. Bakouélé approached and, lifting the enormous hairy arm, helped Dangawé retrieve the spear. He was hard to move; he weighed at least four hundred pounds.

The rain began to fall.

Back in camp Trotty and Dominique, without much hope, had set up the cameras. An hour later there was a great clamour in the forest—"Hohohou, hohohou, hohohou"—and a dozen or more men appeared, towing at the end of a strong liana the great bound cadaver, which they deposited in front of our hut. It was seven feet six inches in height and nine feet in the span of its great arms.

Bakouélé returned the gun; we paid him his reward, and added to it a tartan shirt of Trotty's that he had admired. "You see, Monsieur Noël?" said Alexandre, and then, turning to the villagers, "Listen: this gorilla is very big, he is dead. You see here his bullet wounds." And there they were: on the dark skin of the great barrel chest the mortal holes, from which no drop of blood flowed. "And there," cried Alexandre, "the great spear hole which tore his stomach; thus the gorilla died."

Thus indeed, by that huge tear . . .



# The British North Greenland Expedition 1952-1954

by PETER F. TAYLOR

*In an expedition which was essentially a national effort, all three of the armed Services and the Merchant Navy combined to support scientific exploration and the actual work of exploration was carried out by a team of experts in various sciences. Mr Taylor, who describes in broad terms some of the methods of research that were used and their results, was one of three members of the expedition who spent seven months of the first winter at Northice near the centre of the ice-cap*

ONE evening last August the hills and glaciers around Britannia Lake echoed to the roar of aircraft engines straining at full power to lift a heavy Sunderland flying boat off the water. Each summer for the past three years this sound had broken into the solitude of that austere beautiful Arctic desert land; on the first two occasions the aircraft were flying in supplies for more than twenty men who were to live there for two years, and now finally bringing those same men, together with their notebooks and specimens, back to Britain where the results of their two years' researches in many scientific fields could be analysed and published.

Although on that summer evening we were delighted at the prospect of meeting once more our friends and relatives it was not without some regret that we had nailed up the doors and windows of our hut and said goodbye to the only home we had known for the past two years. As the aircraft climbed and circled Britannia Lake we took a last look at its milky glacial waters, the glistening white glaciers which flowed into it, and the mountains which had been our landmarks, all shown in stark relief by the low light of the midnight sun. The plane circled the lake once more and then turned southward along the East Greenland coast. There was little talk; each one of us was thinking quietly of his own individual experiences during those two years, the events which, taken together, tell the story of the expedition's contribution to contemporary research.

Geographers today are no longer satisfied with a purely descriptive study of the earth's surface. There is an ever-increasing desire to know "why". The explorer of the 20th century, though he must still be adept at living and travelling under hard and primitive conditions, is first and foremost a scientist. Exploration has become, in essence, scientific research.

With great advances in the fields of transportation and the design of scientific instruments the modern explorer has a wealth of new tools at his command. However, the very complexity of much of his equipment compels our scientist-explorer to take as his companions highly trained mechanics and technicians to keep everything working. Thus an expedition of today is made up of scientists and technicians, each man skilled at his own task, but all working together towards the fulfilment of a particular piece of field research.

The British North Greenland Expedition was an example of this kind of expedition. It aimed to shed more light on the nature of Greenland with its great ice sheet covering 85 per cent of the land. We wanted to learn how fast the ice was diminishing, and what were the meteorological factors which allowed it to exist. How thick was it and what was happening to the land upon which its fabulous weight of ice lay? What kind of rocks were there and how much of the history of the ice sheet would they reveal? We wanted to extend northward similar knowledge gleaned by the "Expéditions Polaires Françaises" in the southern half of Greenland.

Alongside these scientific aims there was the broader objective of re-establishing the British tradition of polar exploration which had been interrupted by the war. Many of the lessons learned and techniques developed during the war seemed applicable to expeditions, particularly methods of transportation. We wanted to find out by first-hand knowledge more about the possibilities of mechanical vehicles and aircraft in the Arctic. Here was a unique opportunity for the fighting services to take part in the expedition in their own interests. The Royal Navy and the Army provided stores and equipment and loaned personnel to back up the scientists, whilst the Royal Air Force undertook the necessary fly-

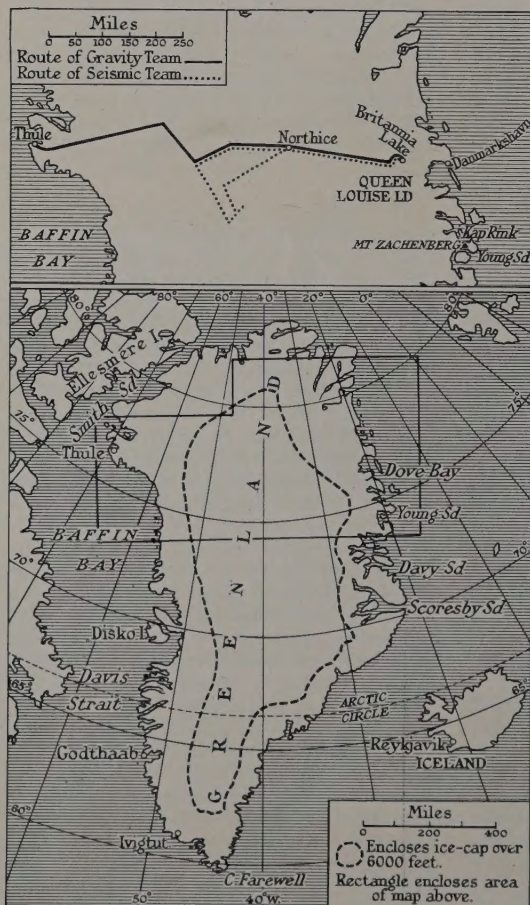
ing to establish the expedition in the field. Such help in kind by the Services and many manufacturers kept the cost down to a sum which could be raised from private and business interests.

Thus it was that in July 1952 I found myself one of twenty-five servicemen and scientists aboard M.V. *Tottan*, a small Norwegian sealer, as she tossed about on the swell of the North Atlantic bound for Greenland. The first port of call was Ivigtut on the southwest coast of Greenland where we embarked thirty-six dogs and numerous barrels of evil-smelling dried fish which was to be part of their diet for the next two years. It was at Ivigtut that we first encountered the generous hospitality of the Danes to whom Greenland belongs. We shall never forget the help given

us on many occasions by trappers, the occupants of weather stations, and the Sledge Patrol. We were certainly quite incapable of forgetting Ivigtut's hospitality next day when, once more at sea, the combined effect of too much food and drink and the antics of the ship in a strong gale produced a number of 'casualties'.

After leaving Ivigtut we called at Reykjavik in Iceland where Commander C. J. W. Simpson, the expedition's leader, joined the ship, and then sailed northward through the pack-ice into Young Sound. The next four days were undoubtedly the most exhausting the majority of us had ever known, as we toiled in the warmth of the Arctic summer to unload the ship's cargo onto the beach at the foot of Mount Zachenberg. Shortly before the job

was completed two Sunderland flying boats of Coastal Command landed in the fjord and anchored near the *Tottan*. Next day three more arrived and we were ready to start the airlift which was to transport men, dogs, and 150 tons of huts and stores 200 miles north to Britannia Lake in Queen Louise Land, a barren mountainous system of *munataks* (the Eskimo name for a rocky peak projecting through an ice sheet) cut by large glaciers spilling out from the inland ice to the west, and barricaded from the coast by the twenty-mile-wide Storstrøm and Bistrup Glaciers. But for the existence 730 feet above sea level of an ice-dammed glacial lake, some five miles long and about two miles wide, which is ice-free for a few weeks in summer, the whole area would be almost inaccessible. It was on the shores of this lake, christened Britannia Lake, that the expedition made its Base, the Sunderlands flying in all the necessary stores and so avoiding the icy barrier of the Storstrøm. Unfortunately the expedition's tracked vehicles called "weasels" were too heavy to be flown in and had to be landed on the coast. At this stage the pack-ice, which had been kind to us on our initial passage, became so dense as to prevent the *Tottan* from penetrating as far north as was hoped, and the weasels were landed at Kap Rink about 150 miles south of Britannia Lake.



A. J. Thornton





*All Kodachromes from the British North Greenland Expedition*

*(Above) The mountains of Clavering Island on the east coast of Greenland overlook Sunderland flying boats moored in Young Sound. On the shore are some of the stores waiting to be flown to the Expedition's Base (below), which was situated at Britannia Lake in a little bay formed by a line of moraine*

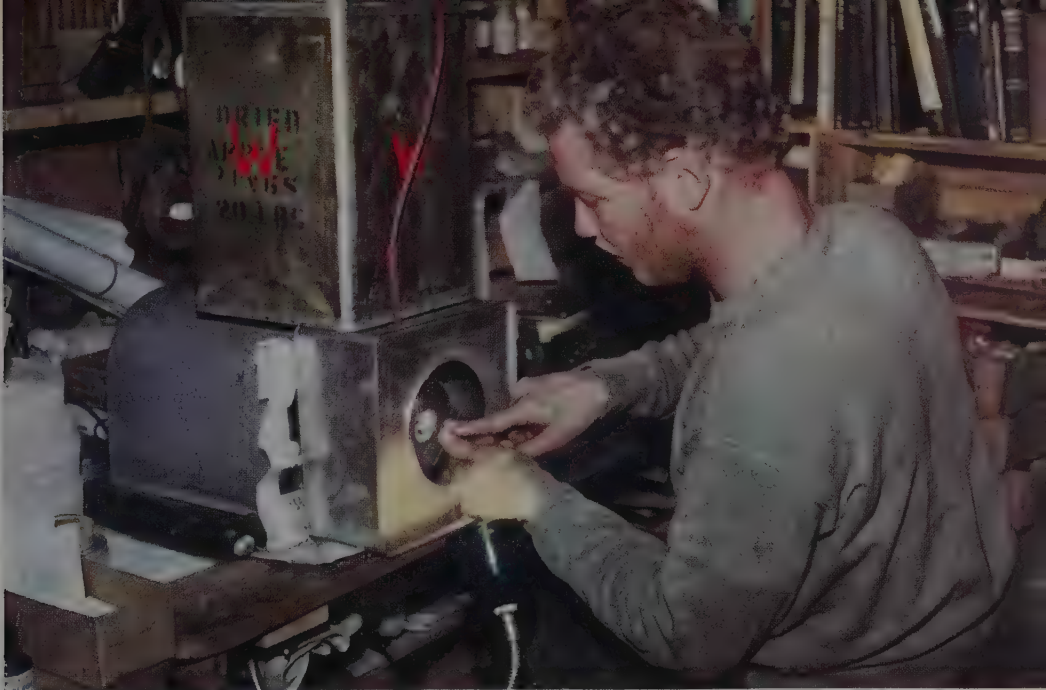




(Above) The Base hut of the British North Greenland Expedition in early spring; in front of it are supplies still partly covered by snow. (Below) The ice in Britannia Lake was buckled into ridges by the Britannia and Storström glaciers as they advanced in winter time. In the foreground is a 'weasel'







*(Above) One of the Expedition's two geologists at work in the laboratory at the Base Camp during the winter. He is preparing a microscope slide from a rock sample that was collected the previous summer.*

*(Below) In the dark months of winter birthdays were occasions for the cooks to display their skill*





*The two geologists on a sledging journey in Queen Louise Land. Much use was made of modern army clothing. The man on the right has a parka over combat jacket and trousers while the other has the lighter and more conventional anorak. Both are wearing mukluks, rubber-soled canvas boots made for extreme cold. The leather sledging gloves were usually worn on a harness to avoid losing them*





(Above) At the Base water was obtained by dipping buckets in a hollow scooped out of the surface of the six feet of ice on the lake; water seeped from below, through a narrow hole drilled in the ice.  
 (Below) Maintenance work on the weasels, often only possible without gloves, took a very long time





(Above) The 'seismic' weasel team on the inland ice during the summer of 1953. The two teams started work with three weasels each, the minimum number consistent with safety. If one vehicle jams in a crevasse, two may be needed to pull it out again. When crossing areas known to be crevassed, the vehicles were joined by heavy nylon ropes and the drivers strapped themselves in with safety-belts. On one occasion when a weasel plunged fifty feet into a hidden crevasse these safety precautions undoubtedly saved the lives of the occupants. (Left) A member of the 'gravity' team measuring angles with a theodolite on the traverse from Queen Louise Land to Thule. This work was done in summer and on calm days the members could enjoy the sun





(Above) Northice, the station on the ice sheet, during the summer of 1953. Chimneys and masts are all that can be seen of the hut and the labyrinth of tunnels buried beneath the surface of the snow.  
 (Below) In summer visitors, always welcome at Northice, were challenged to a game of ice-cricket





*(Above) In the course of their work teams of scientists sledged hundreds of miles over the Queen Louise Land glaciers; dogs were essential for journeys where the ground was too rough for mechanized transport.  
(Below) Dogs were never petted while in harness, but when in camp somebody always made a fuss of them*





By August 20 the airlift was over and we bade farewell to our R.A.F. friends for a year. But the task of establishing the expedition was still incomplete. A small station to be manned by three men was yet to be set up on the inland ice some 250 miles to the west. Although we can rightly call the expedition mechanized, the well-trying huskies were not despised for they are still unequalled for travel with relatively light loads over terrain too rugged for mechanized transport. Later they were to be used exclusively by the surveyors, glaciologists and geologists for their journeys on the glaciers of Queen Louise Land, but now in the absence of the weasels they were to be used to establish the ice-sheet station. Leaving behind some of their companions to finish the building of the Base hut, six men with three dog-teams set off up the Britannia Glacier onto the inland ice. The summer thaw season was over, but there was as yet insufficient snow to level out the icy hummocks and it was only after four days of heart-breaking relaying with the sledges that the easier going at the head of the glacier was reached. This first stage of the journey could have been even worse had it been necessary to carry full loads, but before leaving for Britain the Sunderlands had parachuted a big depot of man- and dog-food at a small nunatak some thirty miles west of the Base. Time prevented us from meeting the drop and it was with some apprehension that we sledged up to the nunatak, lest the parachutes had been blown away by the strong katabatic winds of the past few days. Such winds are caused by a mass of relatively dense air flowing downhill; in this case off the inland ice. Luck was with us and, although one or two parachutes were not to be found and some of the loads had been shattered, there was adequate food to take us the further 200 miles west and, in case of emergencies, back again.

We loaded up our sledges and set off onto the great white dome of the inland ice. For the next fortnight a procession of men, dogs, and sledges moved slowly westward. One man went ahead on skis to lead the dogs whilst the others skied alongside the sledges. Now and again the man ahead would turn round for waved directions from the man on the leading sledge which carried a small magnetic compass. On fine days it was quite easy to steer a straight course by using oneself as a sun compass, but when there was snow falling and the horizon was hidden, one had the impression of being inside a ping-pong ball and it was almost impossible to walk straight for more than a few yards. Apart from a little trouble with

crevasses and one area of particularly soft snow, which necessitated relaying for a day, the journey was uneventful until we were almost at the appointed position for the ice-sheet station. Then several dogs became weaker and weaker and eventually died; the combined effect of heavy loads and increasing cold after the unpleasant sea-journey was too much for them. In view of this trouble we decided to halt two days earlier than had been planned and a radio message was relayed to the R.A.F. detachment waiting at the United States Base at Thule to tell them of our readiness for the air-drop operation which was to establish "Northice", our ice-sheet station.

Next day a Hastings aircraft spotted our tiny tents and dropped the first load, mostly sections of the prefabricated hut. The following day brought treacherous weather with snow squalls but the drop continued. Instruments and delicate apparatus were successfully parachuted and then the giant plane came in low to "free-drop" jerrycans of fuel. On the second such run in, the plane flew into a "white-out" (the aviator's name for the ping-pong ball phenomenon) whilst only fifty feet above the snow surface; a wing tip touched the snow, and in a few seconds the plane had ploughed its way for more than a mile across the snow and come to rest for the last time. By the grace of God the 100-octane fuel did not ignite, but as we sledged over to help, there was a nagging fear lest we should find ourselves with a lot of injured men to be cared for from our as yet meagre resources. There were in fact three casualties, only one of them really serious. The news was radioed to Whitehall and then started a chain of events which culminated in a dramatic air rescue when the men were flown off by two planes of the U.S.A.F. Air Rescue Service about ten days later.

Meanwhile, Transport Command had been continuing to drop food and fuel for Northice. Only delicate apparatus and equipment was parachuted, all food and fuel being free-dropped. On the ground, the six of us struggled to keep pace with collecting the drop whilst at the same time building the tiny hut; a miserable task at temperatures in the minus thirties (Fahrenheit). By this time the dogs were again in fine form, having been rejuvenated by orgies of condemned pork and sausages from the kitchens at Thule. In fact they were in such good form that they thought the humdrum task of collecting supplies terribly dull, and it was no uncommon occurrence to hear shouted words of abuse and look

up to see an empty sledge heading for the camp with the driver falling over in the snow yards behind in his attempts to catch up. One team of dogs abandoned its driver completely and disappeared into the distance. Nothing could induce it to return that night, but next morning the dogs were back, tails wagging, and the work went on.

By October 18 the air-drop was over, the hut built and all the stores collected, and three of the six men at Northice sledged back to Britannia Lake in the autumn twilight, abandoning their companions to the solitude of the winter night.

Meanwhile small parties of geologists and glaciologists had been setting out on foot from the Base to start work on their scientific programmes. A party had man-packed across the Storstrøm to the Danish weather station at Danmarkshavn and thence sledged down the coast to Kap Rink where the weasels had been landed. As soon as the sea ice was thick enough to bear their weight the weasels were moved northward to Danmarkshavn. Here they had to be left for the winter with two mechanics whilst the rest of the weasel party

walked or sledged back to Britannia Lake, assisted by support parties from Base. It was not until the middle of December that the Base wintering party was intact, by which time the sun had long since disappeared.

Despite the months of winter darkness, the Base was always a hive of activity. On an expedition there is no wife or landlady to prepare meals, light fires, wash clothes and darn socks, so the scientist has to turn his hand to the task of living, somehow fitting this in alongside his scientific work. Throughout the winter, weather reports were transmitted three times a day from both Base and Northice, instruments were carefully checked for the following summer's work and some outdoor work was started around the Base. The winter months were the most interesting so far as the doctor and physiologist were concerned, for at that time most members of the expedition were at Base and could be used as guinea-pigs in a study of the body's acclimatization to cold. Every Sunday evening when the scales were produced, some members were alarmed to see how much weight they were putting on. Fat forms a part of

*One of the main tasks of the Expedition was to find out as much as possible about Greenland's ice sheet: its thickness, what meteorological conditions allow it to exist and the relation between its rate of diminution and accumulation. The last was examined by pits which showed the nature of the strata formed by the lower layers of snow being compressed by successive years' snowfalls*

North Greenland Expedition





the body's insulation against cold, and in what became known as the "tickle test" the doctors used to pinch up folds of skin all over our torsos and measure its thickness with a pair of calipers, to observe how the fat was distributed. Other forms of torture were the Harvard pack test, when we had to climb up and down onto a box for five minutes wearing a rucksack whose weight was a third of our body weight, and the monthly blood-letting which earned the doctors the title of "vampires". Analysis of the blood-samples has shown that there is very little change, despite the extremes of environment. Although these studies could best be made when the Base population was more or less constant during winter, it was possible to pursue them most of the time by catching people as soon as they returned from journeys, and even in some cases by making observations on the trail. One such field experiment was a survey of how much food was eaten and absorbed under sledging conditions, and this was compared with a similar survey on the same people at Base.

Throughout the two years we all carried a little card on which we marked how much sleep we took. This was not a way of catching malingers but an investigation into the effect on sleep of the continuous winter darkness and the corresponding summer daylight.

The returning sun saw the surveyors and geologists setting out by dog sledge to begin the main part of their programmes. About the same time, a man-packing party once more crossed that frozen sea of ice, the Storstrøm, to drive the weasels across from Danmarkshavn to Britannia Lake, for without them the programme of geophysical research on the inland ice would have to be seriously curtailed. Snowfall during the winter had been less than expected and frequent katabatic winds roaring down from the inland ice left large areas of land and glaciers bare of snow, so it was only with great difficulty that a weasel route could be forced yard by yard across the Storstrøm. Before the end of April 1953 this critical phase was over, the weasels were at Base, and the geophysical study of the great ice-sheet could begin.

In order adequately to record their results, the geologists, glaciologists and others required a map of Queen Louise Land, and the geophysicists required an accurate height for the starting-point of their traverse across the inland ice. A complete set of air photographs of the area had been made by the Danish Geodetic Institute a few years earlier; our surveyors, therefore, set about accurately

fixing the position of as many points as possible so that a map on a scale of 1 : 250,000 could be drawn from the photographs. Before starting work in Queen Louise Land it was necessary to extend the existing coastal survey in Dove Bay to link the heights of the coastal mountains to those in Queen Louise Land. During the sledging season of spring and early summer 1953, the surveyors sledged amongst the islands of Dove Bay to occupy six new survey stations. It was whilst descending from one of these mountains that Captain Hans Jensen, the only Dane in the party and a good friend of us all, slipped and fell to his death. Autumn 1953 saw the surveyors man-packing amongst the peaks of Queen Louise Land, and the following spring the survey was completed by dog-sledge parties, over eighty peaks having been fixed in the course of the work. One of the principal problems facing the surveyors was that of refraction. The steep temperature gradients over large ice-surfaces bent rays of light and produced mirage effects, thereby making height determinations difficult. In linking the coastal survey with that of Queen Louise Land reciprocal vertical angles were measured simultaneously from both sides of the Storstrøm to achieve the greatest possible accuracy in this, the longest link in the chain of stations. In this way the height of Krebs Bjerg, the starting-point of the inland ice traverse, was determined to within two metres. While we were in Greenland it became evident that a more detailed map of the area around Britannia Lake would also be needed, and during the summer of 1954 about 150 points were fixed in this area to provide ground control for a set of vertical air photographs made by R.A.F. Sunderlands.

The geologists hold the record for the number of miles sledged on the expedition. They made several journeys along the edge of the inland ice and down most of the glaciers of Queen Louise Land. Visits to nunataks and the steep cliffs overlooking many of the glaciers enabled them to complete a very full geological reconnaissance of Queen Louise Land, and provided much detailed information about some of the more interesting rock formations. The hundreds of specimens collected and photographs taken are still being analysed. A journey by sledge across the Storstrøm and along Seal Lake was useful in relating the rocks of Queen Louise Land to those on the coast. The outcrops of rock were not the only interest of the geologists, and they, together with the glaciologists, made photographs, sketches, and notes of

many of the moraines, old river beds, and lake terraces. When these are plotted on our maps they will tell something of the history of the ice in northern Queen Louise Land.

Glaciological researches were mainly directed towards an understanding of the 'balance-sheet' of the Greenland ice mass; that is, the balance between the amount of ice accumulating from snowfalls and the amount which melts away each summer from ablation areas such as the glaciers round the coasts. On the inland ice which is the accumulation area, pits were dug in the snow to reveal the seasonal strata and deduce from them the mean annual accumulation. One such pit fifteen metres deep dug at Northice during the winter of 1953-1954 gave interesting information about the climate in that spot over the past seventy-five years. The only wastage on the inland ice, where even in summer the temperature is unlikely to rise above freezing point, is due to evaporation, and measurements of temperature, humidity and wind speed were made at different heights in an attempt to estimate its amount. Attempts were also made to differentiate between accumulation from snowfalls and accumulation due to drifting snow, a dominant feature of the weather on the ice sheet.

In Queen Louise Land, an ablation area where summer melting produces a continuous wastage of the ice mass, stakes were drilled into two glaciers and the ice and snow levels measured at the stakes at intervals throughout the two years to give a general picture of the extent of the wastage. During the summer of 1953 two stations were set up on one of these glaciers, and detailed observations of the melting were made in conjunction with a study of the lowest few metres of the atmosphere which, together with the sun's radiation, largely controls the melting. However, the constant wastage of a glacier surface does not tell the whole story, for whilst its surface melts, its wedge-like form is constantly advancing as ice flows down from the accumulation area; therefore it is also necessary to know something of the rate of movement of the glacier. Accordingly some movement observations were made on both the glaciers studied. An analysis reveals that the net wastage is, in fact, very small although a two-metre layer of ice melts from the glacier surface each year.

The meteorologists made the normal synoptic weather observations, i.e. observations of the surface weather taken at fixed hours throughout the world for use in weather forecasting and climatological studies; but

their programme also linked with other sciences such as glaciology and physiology. Correct interpretations of such things as the accumulation and melting of ice and snow and the changes in a man's body depend on a knowledge of the climatic conditions. Whilst the glaciologists were observing what was happening in the lowest few metres of the atmosphere, the meteorologists were studying winds and temperatures at higher levels. For this work they used hydrogen-filled balloons. The hydrogen was made on the spot in what appeared to be a cross between a Heath Robinson creation and a witches' cauldron. Like everything else, sending up a balloon during the coldest months of spring, when the temperature may well be lower than  $-70^{\circ}$  Fahrenheit, takes ten times as long as it would at home. Lenses frost up with condensation from the operator's breath, lubricants in the instruments become like treacle, and fingers and toes feel as though they will drop off. Fingers suffer more than most parts of the body, because it is practically impossible to manipulate the delicate knobs of an instrument or fit nuts and bolts on a weasel engine without removing all but perhaps a pair of silk gloves.

Northice, in addition to being a research station, was also an advance base and food and petrol depot for the weasels. There were two teams of weasels, each at the start having three vehicles, trailer sledges and a trailer caravan or "caboose". As time went on, wear and tear and accidents reduced their numbers, but luckily not enough to stop the work. One of the teams was concerned with measuring the thickness of the ice sheet by seismic methods such as are used in oil prospecting. Sound-waves from an explosion just above or below the surface of the ice travel down to the rock beneath and are reflected back to the surface, where they are picked up by delicate instruments and recorded. When the speed of the waves in the ice is known, the time-interval between the explosion and the return of the waves gives a measure of the thickness of the ice. For some reason at present not fully understood it was impossible to obtain reflections in the eastern half of the ice sheet in north Greenland, but further west ice thicknesses of over 9000 feet were recorded. In this area the top surface of the ice sheet is about 8500 feet above sea level, so that the rock surface there is well below sea level.

The other team was engaged in the tedious task of making a gravity survey right across the ice sheet from Krebs Bjerg



in Queen Louise Land to Thule on the west coast of Greenland. Theodolite stations were set up at 350 points on the traverse, two or three miles apart. From the angles measured the height above sea level of each of these points has been computed to give a top-surface profile of the inland ice. The value of gravity was measured at each point. The further a point is from the centre of the earth, the less becomes the weight of an object, which depends on the value of gravity. Thus if one knows the latitude and height above sea level of a place, it is possible to calculate what the value of gravity there should be. However, this calculated value differs from the observed value, when there is a large mass of, e.g., ice between sea level and the station. Knowing the average density of the Greenland ice mass, the gravity team's readings give an approximate idea of the ice thickness, and a section across the ice sheet has been drawn which shows Greenland to be something like a hollow tooth with a filling of ice, spilling out of cracks at the sides in the form of glaciers.

One may say, why bother to take seismic soundings when the gravity readings also reveal the ice thickness? The reason is that there may be a sudden jump in the value of gravity if the kind of rock beneath the ice changes. Thus a few spot-checks of the actual ice thickness are desirable for accurate interpretation of the gravity readings.

Gravity readings also throw some light on what is happening to the rock beneath the ice. The enormous weight of the ice sheet depresses the rigid surface layers of the earth's surface down into the softer layers beneath. Our geophysicists have found that if the Greenland ice sheet were to melt away completely, the centre of Greenland, which is at present below sea level, would slowly rise to form a plateau about 2000 feet above sea level, bounded by the coastal mountains which we know today.



British North Greenland Expedition

*'Weasel' teams of the British North Greenland Expedition journeyed across the great inland ice sheet measuring its thickness. One team took readings with a gravimeter; these depend on the fact that gravity varies with the distance from the earth's centre. Interpreted with other factors, they showed that the underlying rock is largely below sea level*

These then are some of the things we set out to investigate. Space does not permit me to mention any but the principal themes of our research. Work proceeded throughout the two years we spent in Greenland, uninterrupted except for another air-lift by Sunderland flying boats to Britannia Lake in the summer of 1953 and another series of air-drops on the inland ice a few weeks later. In the course of our work we had used methods old and new. We had gained a wealth of scientific information, much useful knowledge about living and working in the Arctic, and an abiding memory of two years well spent in that barren but beautiful land.

# The Roman Empire Displayed on its Coins

by PROFESSOR MICHAEL GRANT, O.B.E., Litt.D.

*This is the second of three articles by Professor Grant of Edinburgh University in which he exemplifies the study of coins as an aid to the geographical interpretation of history, taking his illustrations from the coinage of Rome, the Empire and peripheral countries. He is President of the Royal Numismatic Society and his published works include Ancient History (Methuen, 1952), Roman Imperial Money (Nelson, 1954) and Roman Literature (Cambridge University Press, 1954)*

IN my first article I spoke mostly about coins which illustrated the expansion and defence of that vast organization which for the first and only time created a single Mediterranean unit, the Roman Empire. But to leave the matter there would be misleading. Rome had many associations with its provinces over and above purely military ones, and on many coins it was at pains to stress these more peaceful, friendly links.

For instance, as early as the sixties B.C. one of the moneyers, to whom in this Republican period the coinage was entrusted, places upon his coins the name of his patroness "the Lady of Eryx" (ERVC[ina]) (Fig. 1). Eryx was a town (the modern Erice) and a mountain (Monte San Giuliano) in western Sicily, and its Lady was Astarte or Aphrodite, whom the Romans identified with Venus—an identification which probably began at this great shrine of Eryx. A bird's-eye view of it on its mountain-top, with walls and gate, is shown on this coin, just as so many countries today, notably Turkey, have shown sacred buildings on their postage stamps. The cult of Venus of Eryx had been imported to Rome at the beginning of the Second Punic War (c. 217 B.C.). It was of peculiar importance to Rome because of the ancient tradition—perpetuated by Virgil—that Aeneas had passed that way on his long journey from burning Troy to Italy where, through his descendant Romulus, he was to found Rome. This coin shows very clearly one sort of link forged between Rome and other cities and regions: the religious link.

Fig. 2 indicates a second and equally potent association: that of imperial benefaction. The coin is of the Emperor Tiberius (A.D. 14-37), whose name and titles appear round a large S.C.: this stands for *senatus consulto*, "by a decree of the senate" which authorized, at the ruler's wish, the great brass and copper

coinages. On the other side sits Tiberius as the civil and religious head of the Roman State; out of official modesty he did not place his head on the largest brass issues of the capital. The inscription refers to "the restoration of the communities of Asia" (CIVITA-TIBVS ASIAE RESTITVTIS). The enormously wealthy, heavily populated province of Asia, the western region of Asia Minor, had for centuries been urbanized and Hellenized; its annual governorship was the prize of the senatorial career. Under Tiberius this country suffered earthquakes even worse than the Erzinjan disaster of 1940, the worst sufferer (in A.D. 17) being Croesus' ancient capital Sardes (Sart). The Emperor remitted taxes and provided huge sums for reconstruction. Together with the ever-present gift of the *Pax Romana*, such timely benefactions were what endeared imperial rule to the provincials.

When Tiberius speaks of the "communities of Asia" he uses a word, *civitas*, which might also be translated "city-state". For the Roman government still allowed these cities a very large degree of the self-government that they had traditionally enjoyed. With infinite patience it avoided blue-prints; there were many different formulas. But one right which a great many cities possessed was the right of issuing their own bronze coinage to supplement the great imperial stream. Even diminutive Ilium (Troy), from which Rome claimed to originate, had that right (Fig. 3).

And since this was token currency, there were profits in it. Fig. 4 reveals that clearly, because it explicitly thanks the emperor for allowing the coinage. The inscription round the head means "dedicated to the Indulgence of the Emperor, the right to coin having been applied for and granted" (INDVLGENTIAE AVG[usti], MONETA IMPETRATA). The issuing city was the 'colony' of Patrae (Patras in Greece) (COL[onia] A[ugusta] A[ro]e]



P[atrensius]). These 'colonies' were at the top of the scale of privilege; their inhabitants were Roman citizens. Most colonies had been founded as settlements for ex-soldiers, in lieu (or, from Augustus, in supplementation) of their gratuities. The chariot on this coin is imitated from coins attributed to Tiberius' unhinged successor Caligula (A.D. 37-41), so he is probably the CAESAR mentioned. I have suggested elsewhere that these pieces, unusually large for an eastern colony, celebrated the joint occasion of the colony's half-centenary and Caligula's accession. Dr C. H. V. Sutherland of the Ashmolean Museum, Oxford, has identified a similar joint occasion, at the beginning of Tiberius' reign, at Cnossos in Crete—a city of remote antiquity which likewise, just half a century earlier, had taken on new life as a Roman colony.

Colonies paid great attention to the imperial dynasty, and were more openly flattering to it on their coins than the carefully unautocratic metropolitan mint. On Fig. 5—again under Caligula—Apamea (Mudanya) on the Sea of Marmara depicts the Emperor's deceased mother, Agrippina the elder (as the goddess Vesta) and his three sisters. These appear at Rome, too; but on the Apamean, unlike the Roman, coins Drusilla is called DIVA, "goddess". By that ancient process of grateful 'deification' which is not easy to

grasp today, Augustus had been posthumously declared a god of the Roman State. But it was felt to be much more surprising when Caligula's favourite sister Drusilla died in A.D. 38 and Caligula, distraught, gave her, too, divine status. He evidently did not insist that this untraditional move should be recorded on the Roman coinage. But a far-off and perhaps over-enthusiastic colony had no such qualms—rather as a persevering newspaper of the remote Soviet provinces gets the 'party line' a little wrong and says more than it should. In any case, this coinage for the sisters proved a bad investment for Apamea: in the following year Caligula became hopelessly estranged from the two who remained.

The provincial towns, then, issued their own bronze. But with very few exceptions silver was left to the Roman State. The next Emperor, Claudius (A.D. 41-54), is one of those whose provision for the provinces included silver coins issued for Asia, on the standard inherited from the monarchs of Pergamum (Bergama, between Troy and Sardes). He further indicates his purpose by displaying, on Fig. 6, the archaic cult-image of Artemis or Diana (DIAN[a] EPHE[sia]) in her historical temple at Ephesus (Seljuk). Rome had very early learnt of her cult from the Greek colony at Massilia (Marseilles). Before long, St Paul was to encounter her





(Fig. 1) An obscure Republican moneyer, C. Considius Nonianus (c. 63-62 B.C.), shows a holy place particularly revered by Romans, the Temple of Venus at Eryx (Erice, Sicily). Silver



(Fig. 2) Tiberius (A.D. 14-37), whose name and titles surround S.C. (senatus consulto, "by decree of the senate"), records his 'restoration' of the cities of Asia (Asia Minor) after earthquakes (CIVITATIBVS ASIAE RESTITVTIS). Brass



(Fig. 3) Ilium (Troy), of which Rome claimed to be the offspring, is one of many Asian cities which struck coinage in their own names under the emperors: the figure is Pallas Athene, and the head is of Commodus as a young man (c. A.D. 175-80). Bronze



(Fig. 4) The citizen colony of Patrae (Patras) thanks the 'Indulgence' of Caligula (A.D. 37-41) for granting the right to issue token coinage (INDVLGENTIAE AVG[usti], MONETA IMPETRATA). Bronze



(Fig. 5) The citizen colony at Apamea honours Caligula's mother and three sisters: the late Agrippina senior, the 'deified' Drusilla, Julia Livilla and Agrippina junior (Nero's mother). Bronze



(Fig. 6) Claudius (A.D. 41-54) shows the temple of Diana of the Ephesians (DIAN [a] EPHE [sia]) on his 4-drachma pieces issued for Asia Minor. Silver



power, when "all with one voice about the space of two hours cried out, Great is Diana of the Ephesians".

These numismatic representations of famous monuments and landmarks are of significance to the geographer and archaeologist. Yet they are not photographic, but symbolic—almost diagrams. And the same may be said of a geographical design on the splendid coinage of Claudius' successor Nero (A.D. 54-68) (Fig. 7). This is a 'view' or sketch of Rome's port Ostia, in which gigantic improvements and enlargements had been undertaken by Claudius and were perhaps completed by Nero. The harbour was called the *Portus Augusti* (PORT[us] AVGVST[i] OST[iensis]). "On the left," says Harold Mattingly, "is a crescent-shaped mole, with porticoes and a hall at the end—not unlike a modern pier, except for its shape . . . on the right is a crescent-shaped row of breakwaters or slips . . . the statue on the pillar at the top is a representation of the *Pharos* set at the entrance", like its famous prototype at Alexandria; and Neptune (?) reclines below. This view of the Ostian harbour reminded all Romans that by its construction the emperors greatly facilitated the corn-supply from Africa, and so helped to fill their stomachs. It was in the role of food-provider that they chiefly saw and loved their ruler. Nero did this well, and for a long time they loved him. He even planned to construct a 125-mile canal from Lake Avernus to Ostia, and the coins may well imply a reference to this; but nothing came of it.

The benefactions recorded on their coins by certain later emperors refer to their removal of abuses. When, for example, after the collapse of the first Jewish revolt (A.D. 66-70), Jews had been ordered to pay to Jupiter the silver piece previously paid to the Temple at Jerusalem, lists of those liable had been drawn up with the distasteful aid of informers. The elderly ex-lawyer Nerva (A.D. 96-8) claims to have "removed the false accusations employed for the Jewish tax" (FISCI IVDAICI CALVMNIA SVBLATA) (Fig. 8), though the tax itself remained. But it was tactful also to remove abuses—and glorify the fact—in the nucleus of the Empire, Italy. So Nerva "remits to Italy the expenses of the imperial post" (VEHICVLATIONE ITALIAE REMISSA) (Fig. 9); for Italian cities had suffered from the expensive journeys of his predecessor. Now the mules are set free to graze, and the cart stands tilted and empty. (Nowadays tax-relief is not recorded on coins. Totalitarian countries re-

cord it on stamps; but in a democratic country the opposition, which could not share in the credit, might object.)

Nerva, though he was not strong enough to deal with a difficult political situation, did something more for Italy, too. Fig. 10, on which the senate and people offer homage to his great successor Trajan as "the best of rulers" (S.P.Q.R. OPTIMO PRINCIPI), celebrates his scheme (probably based on steps first taken by Nerva) for helping Italian orphans (ALIM[en]ta ITAL[ia]e). "It arranged for the education of the orphans, and endowed it from the proceeds of land-mortgages, for which the government advanced money on reasonable terms and at low rates of interest. This not only helped orphans; it also encouraged farming. So, on the coins, the figure protecting the child is *Annona*, goddess or personification of the Corn-supply—and it is an ear of corn that she is holding." (H. Mattingly.)

In my first article I showed how the Roman government depicted provinces as conquered territories. But in the 2nd century A.D. they began to be thought of in a more humane and cooperative spirit. For example *Dacia* (Rumania—annexed by Trajan), though she is first shown in the dejection of defeat, appears in due course in a much more hopeful and peaceful guise (Fig. 11). As a "province of the Emperor" (DACIA AVGVST[i] PROVINCIA) she is shown in national dress (with pointed cap), accompanied by two children carrying grapes and corn—the crops of the future (a favourite theme on Italy's modern coinage, too). *Dacia* is Rome's friend, and it is in this capacity that she bears the Roman standard. Those who recall stories of Trajan's slaughters and deportations have cause to doubt; yet it was at least a step forward that propagandists now felt a humane presentation to be necessary.

But it was under his successor *Hadrian* (A.D. 117-38) that these developments led to a sensational change. Hadrian loved Greek culture and was the greatest imperial traveller that the world has ever known; the larger part of his reign was spent in a series of royal tours. And it was his humane genius that defined the Empire as "no mere system of dependencies, but a living organism, alive in all its parts—each sharing, each enjoying, the personal interest and care of emperors." On a memorable and unparalleled series of coins he commemorated his own arrival in no less than seventeen territories (e.g. Fig. 12, ADVENTVI AVGV[usti] MAVRETANIAE), and his 'restoration' by beneficent measures



(Fig. 7) Nero (A.D. 4-68) offers a bird's-eye view of the greatly enlarged harbour at Ostia (PORT[us] AVGVST[us] OST[iensis]). Brass



(Fig. 8) Nerva (A.D. 96-98) claims to have eliminated false accusations from the compilation of the Jewish tax-roll (FISC[us] IVD[ae] CALVMNIA SVBLATA). Brass



(Fig. 9) Nerva also records the remission to Italian cities of the expenses of the imperial post (VEHICVLATIONE ITALIAE REMISSA). The mules now graze beside their empty cart. Brass



(Fig. 10) Trajan (A.D. 98-117) alludes to the scheme to help orphans and encourage farming by a programme of education and loans, the ALIM[entum] ITAL[iae]. Annona, the Corn-Supply, is seen holding a corn-ear over an orphan. Brass



(Fig. 11) Trajan shows Dacia (Rumania) in national dress, with children bearing fruit and corn. As Rome's 'friend', she is holding a Roman standard. Brass



(Fig. 12) Hadrian (A.D. 117-138) issued a remarkable coinage celebrating his arrival in seventeen provinces—here Mauretania, who is depicted with elephant-hide head-dress. Brass





(Fig. 13) Another great series of Hadrian honours his 'restoration' of provinces, here his home-country Hispania (*RESTITVTORI HISPANIAE*). Brass



(Fig. 14) *AEGYPTOS* on a coin of Hadrian, with sacred rattle (*sistrum*), basket of fruit or corn, and Ibis on column. Brass



(Fig. 15) Antoninus Pius (A.D. 138-61) lays particular stress on historic Italian themes: this is Father Tiber (*TIBERIS*), with ship, emptied urn and reed. Brass



(Fig. 16) In honour of his late wife the 'deified' Faustina, Antoninus Pius shows Cybele, the Great Mother of the Gods (*MATRI DEVM SALVTARI*). Between two lions, she sits in 'towered' crown, holding a drum. Brass



(Fig. 17) Commodus (A.D. 180-92) equates himself with Hercules, whose lion-skin he wears and whom he depicts ploughing the furrow of a Rome reborn as 'colonia Commodiana'. Brass or bronze



(Fig. 18) Septimius Severus (A.D. 193-211), wearing armour—in keeping with the pro-army character of his rule—honours the land of his birth *AFRICA* (cf. Fig. 12). Brass or bronze

of twelve. Fig. 13 shows his 'restoration' of Spain (RESTITVTORI AVG[usto] HISPANIAE)—in which his ancestors had settled: for Hadrian himself, like Trajan before him, was a provincial and a Spaniard. In my previous article I mentioned how on the same great series he honoured, without fear, the provincial armies, and recorded a military province such as Britannia as collaborator in its own defence (for, unlike Trajan, he preferred defence to expansion). Peaceful civilian countries of the Empire, too, are represented. On Fig. 14, Egypt is shown holding the emblems of the traditional religion it was encouraged to follow, and leaning on a basket full of the fruit or corn which was its wealth and Rome's nourishment.

But Hadrian's successor Antoninus Pius (A.D. 138-61), though a very enlightened man, considered Hadrian had gone too far in this cosmopolitan (and pro-Greek) direction; and his own coinage soon settles down to a markedly Italian emphasis, with frequent evocations of antiquarian, Virgilian themes. Now, for example, the recumbent deity on Fig. 15 is not Aegyptus but Father Tiber, crowned with reeds (a type of figure often imitated since). A Roman river-boat is seen behind him.

Yet Roman religion could not keep the more satisfying Eastern mystery cults from gigantic expansion in this epoch; this expansion preceded, and in some measure prepared the way for, the wide acceptance of Christianity. The mystery religions were by no means new at Rome. Indeed Cybele, the Great Mother of Asia Minor, had been officially brought to the city as early as 205-4 B.C. The worship of Attis, her fellow-guardian of the grave, whose resurrection was honoured at the Roman festival of the "Hilaria", had been recognized under Claudius. But Cybele's Asiatic sacrifice of a bull, and baptism in its blood, first appeared in Italy in the 2nd century A.D., and spread enormously in the West within a few decades. Cybele, goddess of fertility, was especially revered by women. On Fig. 16 she appears with her lion and Eastern 'turreted' crown on a coin of Antoninus himself, struck in honour of his deceased wife Faustina, whose head is shown posthumously, like Eva Peron's on modern Argentinian stamps. The inscription is "to the Mother of Gods who bringeth deliverance" (MATRI DEVM SALVTARI).

The mystic cult of the East impinged forcibly on Roman cult a few years later. For Marcus Aurelius' much less rational son Commodus (A.D. 180-92), living in a time of

fanatical religious excitement, passionately embraced the fervent and emotional Eastern religions—becoming, incidentally, an admirer of Mithras, whose shrines now begin to spread at Rome. At the end of his revolutionary reign this outlook caused him to reaffirm in far stronger form the cosmopolitanism of Hadrian, and even with great effrontery to declare himself refounder of Rome as a "colony of Commodus". Fig. 17 depicts him in lion-skin as the reincarnation of Hercules, who is seen, on the reverse, ploughing the foundation furrow.

After the ruinous civil wars that followed the death of Commodus (and had to be paid for), this centrifugal movement gained further force. For when the fierce victor Septimius Severus shows AFRICA on his coins (Fig. 18), in national elephant head-dress, this means no conquered province and not just one of a series of benefited territories, but the country of the emperor's origin and special favour.

Under the almost totalitarian rule of Severus, Italy was beginning to sink to the level of the provinces. The time had come, too, when very few emperors were Italians. The wife of the African Severus was a Syrian, and her grand-nephew was that most bizarre of emperors Elagabalus (A.D. 218-22) who, conducted from Syria to Rome aged fourteen, imported with him the highly orgiastic cult of which he had been hereditary priest at Emesa (Homs). Fig. 19 shows on his coins in solemn procession the phallic Black Stone of the Emesan Sun-god, inscribed "to the holy Elagabalus, god of the sun" (SANCT[o] DEO SOLI ELAGABAL[o]). Roman tradition went for nothing. The proletariat enjoyed the exotic pageantry, but national leaders could scarcely be pleased to see the Black Stone solemnly married to the Roman Minerva!

After his brief reign there was a return to outward convention, but the progress of Eastern beliefs was not arrested. And now Rome, hard-pressed by incessant foreign and civil wars, plunged, to the misery of millions, into a bankruptcy which the rapidly debased coinage clearly records. The Empire, too, very nearly split into fragments. But it was saved (though the standard of living was not) by a series of almost superhumanly able men produced, at this critical juncture, by the Illyrian and Danubian territories of the Empire. The first and least successful of them, Decius (A.D. 249-51), duly records his homeland, PANNONIAE, the Pannonian provinces (Fig. 20). He sought to find a scapegoat for disintegration by blaming the Christians in the name of the old religion.





(Fig. 19) Elagabalus (A.D. 218-22), on a coin perhaps issued at Nicomedia, shows the conical stone of his Syrian deity in a triumphal chariot, dedicated "to the holy Sun-god Elagabalus". Gold



(Fig. 20) Decius (A.D. 249-51), the first of many emperors from the Danubian region, honours the two Pannonian provinces (PANNO-NIAE). Gold



(Fig. 21) Aurelian (A.D. 270-5), wearing the 'radiate' crown of his patron god the victorious Sun, celebrates his arrival in Rome after remarkable victories. Gold



(Fig. 22) Local coinage of Byzantium. The head is of Plautilla (A.D. 202-5), wife of Caracalla who appears on the reverse as a municipal official. Bronze (medallion)



(Fig. 23) Constantine the Great (A.D. 306-37) displays the Christian symbol at his new capital CONS[antinopolis], invoking Hope (SPES PVBLICA). Silvered bronze



(Fig. 24) Constantine struck coins and medallions in honour of both Rome (VRBS ROMA) and Constantinople. Bronze (medallion)

Aurelian, from the same area, instead grafted onto the traditional cults Christianity's greatest rival, the world-wide solar faith, with which in popular belief Mithraism was identified. On a large gold piece, perhaps less of a coin than a medallion (Fig. 21), Aurelian wears the 'radiate' crown of the Sun as he celebrates his arrival in Rome (ADVENTVS AVG[usti]) after mighty victories in the northwest and east.

Further persecutions awaited the Christians; but then the official *volte-face* under another Illyrian, Constantine the Great (A.D. 306-37), is duly recorded by the appearance on his coins of standards bearing the Greek initial letters of the name of Christ (XP) (Fig. 23). The geographical significance of this piece is equally great, for it bears the mint-mark of the new capital founded by Constantine in 324-30, CONS[tantinopolis]. In the previous half-century it had become clear that the whole Empire could not be safely controlled from the imperilled West. Yet another Illyrian, Diocletian (A.D. 284-305), had left a colleague there, but himself ruled from Nicomedia on the Sea of Marmara

(now the Turkish naval base of Izmit). Constantine rejected as an alternative his own birthplace Naissus (Nish), since he recognized the extraordinary strategic advantages of Byzantium (for its local coinage under that name see Fig. 22), which controlled not only the sea but that vital storehouse of men and riches, Asia Minor.

But, in celebrating its foundation, he simultaneously commemorates "The City of Rome", VRBS ROMA (Fig. 24), displaying its most ancient and unmistakable type, the wolf and twins. The potency of *Romanità* was immense. It outlived Rome's eclipse not only as capital of the Roman world, but even as capital of the Western Empire: for that also was successively displaced to Augusta Trevirorum (Trier) (A.D. 375), Vienna (Vienne, south of Lyons), Mediolanum (Milan) and Ravenna. But the idea of Rome lived on, surviving even the shrinking of the frontier to exclude Italy itself (A.D. 476). Thereafter the 'Byzantine' Empire continued for a thousand years; lacking Rome (except for a short time in the 6th century), but still claiming to be Roman.

*The author wishes to acknowledge his gratitude to the following for the illustrations: British Museum: Figs. 1, 11. Messrs Glendining and Co., H. P. Hall sale II, 1950: Figs. 6, 8, 10, 12, 22; L. A. Lawrence sale II, 1951: Fig. 24; V. J. E. Ryan sale V, 1952: Figs. 5, 9, 13, 14; J. C. S. Rashleigh sale I, 1953: Fig. 20. Ars Classica sale XVI, Geneva, 1933: Figs. 2, 7, 15, 18, 21, 23. Münzhandlung Basel sale No. 10, 1938: Figs. 3, 19. Messrs Christie, Manson and Woods, Earl Fitzwilliam sale, 1949: Figs. 16, 17. Kunsthistorisches Museum, Vienna: Fig. 4*



# Greek Village Wedding

by MAY STERLING



*The village postman returning to Stiri, a village in the mountains overlooking the Gulf of Corinth*

Philip B.

THE village of Stiri lies on the edge of the road that leads to the monastery of St Luke, famous for its Byzantine mosaics. But no-one ever stops at Stiri. All the interest, movement, purpose is towards St Luke. Tourists, historians, artists, government officials piloting some foreign diplomat, whiz past the village in limousines, jeeps, lorries, buses. The villagers rush out of their houses to see what is happening; the men leave their game of cards or backgammon, the women smooth out their hair under their black shawls, the children run out of the kitchen barefooted—but nothing happens; no-one stops. All that is left to them is an even thicker coating of dust over their dry houses. They witness everything, the fuss and colour and variety, but have no share in it. The excitement merely touches them, passingly touches them, and goes elsewhere for its flowering. So Stiri remains what it has always been: a very small Boeotian village of 700 inhabitants, wedged between Mount Parnassus and Mount Helicon, about 110 miles from Athens. Not par-

ticularly beautiful; definitely poor, yet not particularly unhappy. The houses of the village are small and square, with tiled roofs, unlike the flat terraced tops of the island houses; mostly made of stone, whitewashed inside. If you pass your hand over the white-wash, you will find it rough, encrusted with little bits of wheat chaff and grain. The floor of the upper storey, if there is one, is made of wooden boards painted yellow; as a rule, the only furniture apart from the bed consists of huge trunks and chests and vast piles of linen covered with rough, hand-woven blankets, forming large cubic blocks of various sizes, arranged sparsely in the empty space of the room; they are used as seats, tables, or shelving-space according to need and circumstance.

Apart from the three cafés, the main centre of attraction in Stiri is the cistern. It is edged and covered with concrete to keep dirt and dust out. In the morning and especially at dusk, a slow procession of women, their thin plaits hanging down their backs and a small,

oblong barrel roped to their sides, move towards the cistern among horses, stray goats and tumbling children.

Between visits to the cistern, Stiri is very quiet. Women sit about with their spinning distaffs, on a bench, a chair, a stool, a stone; some stroll across the street, still holding the distaff; others bring out their babies. The men are by themselves, at the café, but not distant; there is a flow, an exchange of small lazy talk between the two groups. Dogs and cats lie in the sun, undisturbed. An old man walks by holding an ancient sewing-machine in one hand and a bottle of bright blue spirit in the other. On the balcony of a derelict wooden house, a young woman rocks her sick baby lying in the hollow bark of a tree-trunk. The baby has three safety-pins attached to his rags; blue beads and amulets against the evil eye; and she calls him Plutarch. Cooking, baking and butchering give rise to isolated bursts of activity; against this background the still figures in the sun stir, shift for a moment, then settle into yet another pattern of stillness; looking outwards always.

\* \* \* \*

A wedding is a great event in a place like this, as important as a funeral, or an election; whether it is for dancing or for lamenting, everyone in the village has a right to participate: these are public events.

Weddings always take place on a Sunday, and in the morning, so as to leave plenty of time for dancing. But the festivities really begin on the eve of the wedding. The bride and groom are not allowed to visit each other's homes for a whole week before the wedding; they may only catch glimpses of each other during the evening stroll in the square.

In this particular week in August, it seemed as if both Petros Trakis, the groom, and Katerina Markou, the bride, were going to be of a very happy disposition in their married life for the sun shone steadily in a cloudless sky. The groom was twenty-three, in the Army, on twenty days' leave. Before enlisting, he was a musician, a *sanduri* player, going from tavern to tavern, from village to village, with two or three other musicians to liven up drinking parties, weddings and christenings. The bride was twenty-five; her father was moderately wealthy, owning some land and a small flock of sheep; for her dowry he gave her a small plot of land and ten sheep. The bride, however, must complete her dowry with clothes, linen, household articles which she begins preparing, with the help of her mother, at the age of twelve. Finally,

there are a few items which must be provided by the groom's family. Thus on the eve of the wedding Petros' family set out for the bride's house in a noisy procession: the musicians came first—a fiddle, a clarinet, a guitar, a *sanduri*; then came the groom's gifts: the wedding-dress, held up high on its hanger like a white banner; on either side of it, little boys holding trays with the white wedding shoes, the stockings, the jersey slip, and the father-in-law's clothes; more gifts followed behind: a mirror, a glass dessert set. The procession ended with a choir of men in shirt-sleeves. "Who is that cherry-lipped girl?" they sang as they went, and the villagers, hearing the passing music, came out to join the procession.

In their house the bride's family, too, hear the festive strains approaching, and come out on the veranda to greet the procession. A woman from the groom's household comes up the steps holding a tray with a carafe of wine; the other women in the group hold sprigs of sweet-basil and little bags filled with rice and almonds. Among a noisy exchange of kisses and good wishes, they sprinkle the bride's dowry, lying exposed in the main room, with the contents of the bags, and pin the sweet-basil to the pillows and mattresses, while the children scramble wildly for fallen almonds. Wine is offered all around; the groom's family examine the bride's dowry, the bride's family, examine the groom's newly arrived gifts. But the young girls are impatient; they ask the older relatives to make way and start dancing in a semicircle, hands clasped.

Meanwhile, the groom's house does not remain empty and silent, but becomes the scene of parallel festivities. Both households separately celebrate the coming of the great day till late evening. If a member of the bride's household comes over to the groom's, or *vice versa*, his face is smeared with soot and he is sent back in this state to the other party. The groom's party usually lasts longer into the night, as it consists mainly of men, and ends with lusty, drunken serenading in the village streets.

Sunday morning at last. In his father's house, still a bit groggy, Petros surrenders passively to the deft hands of the barber, who has closed shop for the day to come and shave him. The shaving is public, like the rest of the celebrations (except the service itself). People come in and out of the house, sit around the groom, throw laughing insinuations at him. The musicians arrive too, and group themselves in a corner; they take a bite





All photographs by Philip B.

*This is Stiri in the morning—Stiri in the heart of summer, between the corn-harvest and the vintage. There is not much work to be done in the fields now. The men sit about at the café tables playing with their amber beads; the women, in orange skirts and woollen stockings, spin away vacantly, spitting on the thread to make it stiff. Only the loud solitary ranting of one of the men, talking politics, breaks the stillness. Tomorrow will be different, for a wedding is to take place, a great event in the village*



Against a brightly printed tapestry representing a Turkish harem, the musicians play to the bridegroom while he is being shaved, trimmed and powdered. The instrument in the centre (like a xylophone with strings instead of wooden bars) is a sanduri. The musicians are singing a popular folk-song: "Joy to the eyes of the groom that chose such a bride." The groom's guests join in, while his mother passes round a Greek version of haggis, with heart-shaped buns and wine





*White talcum-powder in a pink plastic salt-shaker, crumbled rouge on a piece of cotton wool, messy lipstick-ends, and tight Minoan curls: friends and relations hold their breath as one of the village-girls gives the bride a beauty treatment. She dabs away laboriously at the stone-still face, making it dusty-white. In Greek villages girls rarely paint their faces, but they do so on their wedding day, for the swarthy Greek male has a predilection for fair-skinned beauty*



*The dowry must not be carried down the stairs, but thrown from the veranda onto a large red carpet spread below. The groom takes the best pillow and throws it down first. The others follow with more pillows, with striped blankets and bright pink sheets, eiderdowns and towels—the air is filled with a great multicoloured flapping and a smell of sweet-basil*

*Red roses and a mirror catch the sun—all the other presents are momentarily eclipsed, for the bride's father appears with one of his gifts to her: a mirror in a painted tin frame, combined with towel-rail and towel. It is a special present which he has entrusted to his niece who will carry it below, where two lorries are waiting to take the dowry to the bride's new home. "Go now, but gently, gently," he says. "Where is the rope? Tie it securely—over the yellow eiderdown." But all she is thinking of is how to get a ride on the loaded lorry*







*The ceremony is over, the hush is broken. The newly-weds go down into the courtyard and begin to dance, surrounded by their friends. The musicians sing out shrilly: "What is the price of a kiss—in the West and the East? Four pennies for the married girl's kiss, but fourteen for the widow's." A white folded handkerchief is pinned to the groom's lapel, so that the bride can single him out in the crowd*

of stuffed innards, a sip of wine, and start playing. At the bride's house, everything is quieter; there is always a touch of solemnity and even the most frivolous woman goes about the ritual of dressing and making herself beautiful. Around 10 o'clock Petros sets out for Katerina's house with the musicians, his relations and friends, and the two orange-blossom crowns with which he will wed her.

Petros is greeted on the threshold by his future brother-in-law, who pins a white folded handkerchief to his lapel, "so that the bride may know him". Petros and Katerina exchange not a word as they meet, only a small, uncertain smile. Until the ceremony begins they will stand separately in the big room—she among the womenfolk, her eyes lowered, he among the menfolk, smiling rather cockily.

At 11 o'clock, the priest from the monastery of St Luke arrives and the ceremony begins. Only close relatives are allowed to attend it; the other guests wait outside in the sun, giggling, munching buns, recounting the splendours of the bride's dowry. There is a hush in the big room as the priest reads the liturgy, under a swallows' nest tucked against a beam in the ceiling. Katerina has a pre-occupied air; perhaps she is worrying about her veil, or her unfamiliar make-up. Petros has an expression of vacant satisfaction; from time to time he moves his neck slowly, like an Indian dancer, as if to loosen his stiff collar. A little boy stands by the couple, breathlessly holding a tall white candle; a young girl with a vaccination-mark on her cheek looks on, absorbed. There is a fragrant smell of incense, burnt wax and crushed sweet-basil.

"Isaiah, dance, the Virgin hath conceived in her belly a son . . ." The ceremony is nearing its end, the priest takes hold of Petros' hand and leads the couple round the table three times for what is known as the Dance of Isaiah. The Prophet Isaiah is called upon to dance and rejoice, for his prophecy about the birth of Christ has come true; and the faithful dance with him. Handfuls of rice are thrown at the couple as they shuffle round the table, the tension is relaxed, there is laughter.

Petros and Katerina are man and wife now. The relatives file before them to kiss their orange-blossom crowns. They are preceded by the bride's father and the groom's father, who jerk their hands in their children's faces to be kissed, as a sign of filial submission.

The door bursts open; the crowd presses in, clamouring for the bride and groom. Petros takes Katerina by the hand and leads her down to the courtyard where they will begin

the dance. Petros bounces happily to the sound of the music, as if the long hours on the barber's stool and before the priest had cramped him; Katerina follows his steps, more demurely. Under the scorching sun, their faces begin to stream with perspiration; soon there is hardly any vestige of the careful make-up on Katerina's face; but she does not seem to mind any more.

The dancing breaks up for lunch. The traditional meal is served at the groom's house: roast lamb and kid, green salad, olives and onions, white goat-cheese, a barrellful of wine. Eating and drinking continue till 5 o'clock in the afternoon, when the couple must resume their dancing, down on the square this time, for everyone to see. The sun is still hot there. The dancing semi-circle grows larger as the relatives join in. As they jog past gifts are thrown over their right shoulders: shirts for the men, blouses for the women. The best man acts as Master of Ceremonies. He is the one who picks out the people whose turn it is to dance, following a strict hierarchical code. No-one is allowed to ignore his summons. He inflicts various penalties on the transgressors, offers wine to the dancers. The only person who is not allowed to take a rest is the bride: she must go on dancing without stop till nightfall, or be dishonoured. When a visitor from Athens remarked on the cruelty of such a custom, the Stirites stared at him in smiling amazement. "But this is *her* day!" said the Mayor, and his daughter added: "All during the week, everyone has been toiling for her sake, to prepare her wedding. Now it is her turn. She's *got* to get tired."

Perhaps they are right. This is indeed a day in a lifetime, never to be repeated—for a very simple reason: it is too expensive. Perhaps this explains the rarity of divorce in these places; such a day must needs remain unique and unrepeatable, owing to its very nature, owing to the enormous amount of fuss, fatigue and expense involved. And so Katerina dances on uncomplainingly. In a few months she will be sitting on a doorstep, spinning away the hours, absent-mindedly listening to the clucking of scattered hens or the whining of Plutarch in his tree-trunk cradle; having a word with the midwife about her coming baby; calling out to the shepherds as they tramp up the hill to their flocks; waiting for the postman to bring her a short, solemn letter from Petros, serving in some distant barracks; gaping, not altogether unsatisfied, at the blue tourist-bus that passes through Stiri, unseeing.

# The Story of Beer

## I. The First Five Thousand Years

by BRIAN SPILLER

*It is often difficult to separate the question "Where?" from the question "When?"—the geographical from the historical; and if Mr Spiller's first two articles about beer and brewing tend to answer both questions, that is because in the present context they are practically inseparable. Place and time will coincide in the third article, which will describe modern brewing in England*

How or when the story began, nobody knows. One can only guess that whenever Neolithic man started to grow crops, he stumbled sooner or later on the process of fermentation, and so learned how to brew beer. The discovery was made independently at different periods in various places.

Recorded history begins in the Ark; Noah is apparently the first producer of alcoholic liquor to be mentioned by name. *Genesis* relates how he began to be a husbandman. "And he planted a vineyard, and he drank of the wine, and was drunken." This experiment stimulated the early Biblical commentators to learned argument: was this the first time that wine was made? Some scholars opined that "a liquor so generally useful and agreeable could scarcely have been unknown to Adam himself". If so, others retorted, Abel would have included it in his

offerings to the Lord, and Noah would have been on his guard. The counter-argument was that Noah, though aware of the intoxicating properties of wine, might have miscalculated its potency on this occasion.

But *Genesis* is not the only source of biographical information about Noah. Supplementary details are revealed in an Assyrian version of the Flood story, inscribed on a clay tablet unearthed at Nineveh. This contains an account of the arrangements for making life tolerable on the Ark. "For our food I slaughtered sheep and oxen, day by day," part of the translation runs, "with beer and brandy, oil and wine, I filled large jars." It seems legitimate to infer from this passage either that Noah was himself a brewer and distiller, or that the liquor trade was already in being before the Deluge.

In any event, it is in Mesopotamia and Egypt that one expects to find the earliest archaeological evidence of brewing. Here, some six thousand years ago, were the twin cradles of civilization, each rich in cereals, the basic raw material. Already in the second period of Sumerian civilization, the god Anu was accustomed to receive offerings of four kinds of beer in the temple of Uruk, the older neighbour of Ur. And although beer was a drink fit for the gods, it was not accounted too great a pleasure for the lower classes; King Hammurabi, author of the world's oldest code of law, regulated its manufacture and sale in the interest of consumers. Severe penalties were imposed on delinquent tavern-keepers. The punishment for supplying short change or short measure was drowning, and for harbouring rebels, death by a means unspecified. Lapsed priestesses who kept or even entered a tavern were buried alive. Against these formidable occupational risks must be set the rewards: a hostess named Ku-Bau or Azag-Bau, the forerunner of all barmaids who married well, founded a royal dynasty at Kish in 3100 B.C. The ancient Egyptians also made offerings


  
 Make not thyself helpless in drinking in the


  
 beer shop. For will not the words of [thy] report repeated


  
 slip out from { thy mouth } without { thy knowing } { that thou hast uttered them ? }


  
 Falling down thy limbs will be broken, [and]


  
 no one will give thee { a hand [to help] thee up } as for thy


  
 companions in the swilling of beer, they will get up


  
 and say, "Outside with this drunkard."

*From The Dwellers on the Nile, by Sir E. A. Wallis Budge (Religious Tract Society, now Lutterworth Press)*

*This dreadful warning to Egyptian drunkards is taken from the Precepts of Anu, written circa 1500 B.C. Copied from the original papyrus*





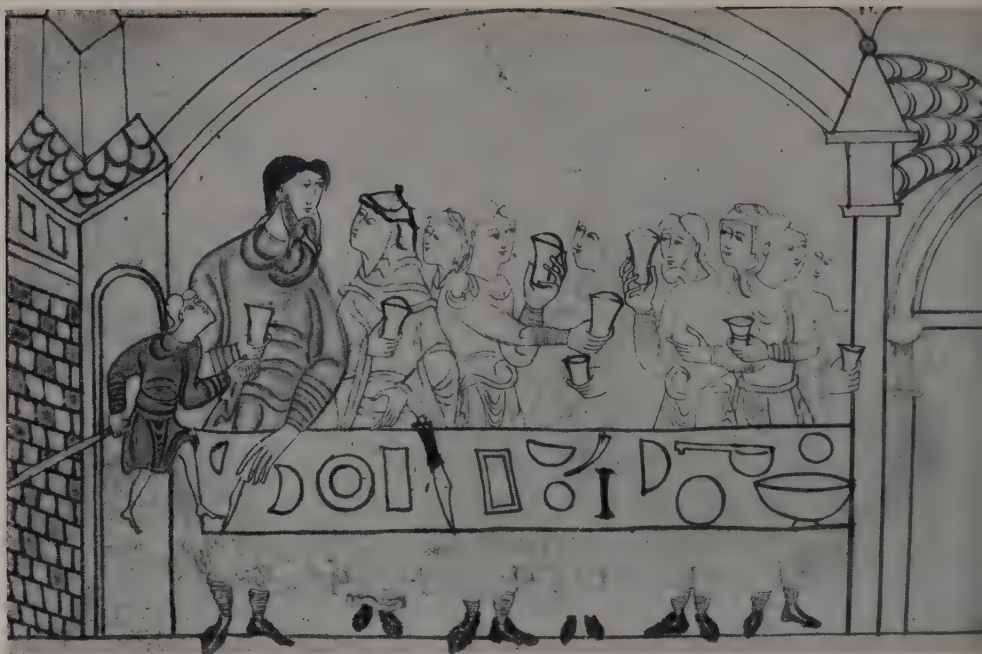
From The Tomb of Neferhotep at Thebes, Metropolitan Museum of Art, New York

*A mural from the tomb of Neferhotep at Thebes (the ancient capital of Upper Egypt) of about 1300 B.C.: a 'strip-cartoon' showing, at the top right, a banqueting hall with guests and musicians, while supplies for the revellers are being brought in at the left. Below is the butler's pantry*

of beer to their gods—with perfect propriety, since they attributed its invention to the Sun-god Rā. It was the common drink of the country and a basic article of diet. Boys in the temple schools had a daily allowance of three cakes of bread and two jugs of beer, brought to them by their mothers. The king and every person of quality kept his own brew-house. The lower orders met socially at the House of Beer, "untold numbers of which", Sir Wallis Budge informs us, "must have existed throughout the country." The beer possessed remarkable potency; and since the Egyptians were gregarious people, fond of eating, drinking and having a good time, the results may be imagined. As the moralist Tuaf sensibly observed some five thousand years ago: "If thou wilt control thine appetite, thou wilt be listened to; if, having eaten three loaves and drunk two pitchers of beer, thy belly is not full, then thou must fight against it." Then there is a salutary warning to drunkards in *The Precepts of Ani*, illustrated on page 86. *The Precepts of Amenemapi* draw a gruesome picture of the consequences of gluttony: "Pass not thy days in beer-

houses and eating places, or thou wilt become a mere mass of food."

The exhortations of priests and sages do not seem to have led to much moral improvement. Revellers are whimsically portrayed in sculpture and murals in various stages of intoxication. J. G. Wilkinson, a Victorian Egyptologist, explains that these unedifying scenes "do not, however, appear to refer to members of the higher, but of the lower classes, some of whom indulged in extravagant buffoonery, dancing in a ludicrous manner, standing on their heads, and frequently in amusements which terminated in serious disputes." Nevertheless the lower orders were set a deplorable example by their betters. "The great King Amasis himself", according to Sir Wallis Budge, "is said to have been very humorous when in his cups, as he not seldom was." The rich got tipsy on wine, and the poor on beer. The effects were no doubt the same, except that, as Aristotle observed, "persons intoxicated with wine pass out lying on their faces, while those drunk with beer invariably lie on their backs." The gods themselves are represented



British Museum

"The earliest fragments of English literature describe convivial ale-drinkings at royal courts."  
 (Above) Anglo-Saxons pledging at a dinner party; a decoration from an illuminated manuscript of the 11th century. (Below) Harold and his companions drinking ale before embarking at Bosham for his fatal visit to Duke William in Normandy: a scene from the Bayeux tapestry (late 11th century)

Crown copyright, Victoria and Albert Museum



as getting drunk, and no wonder, since beer of appropriately celestial quality was provided. "The King in heaven", a later text informs us, "eats the bread that Rā eats daily, and he drinks what Rā drinks. The bread that he eats never grows stale, for it is the Bread of Eternity; his beer never grows sour, for it is the Beer of Everlastingness."

Magical properties of a lesser order were confidently attributed to the beer brewed this side of paradise. Doctors prescribed it as a laxative, as a specific for various diseases, and as a cure for the sting of scorpions. Among the recipes in the *Ebers Papyrus*, a medical textbook of about 1600 B.C., there is "a delightful remedy against death": half an onion in the froth of beer. It was inevitable that the commercial production of so useful a commodity should gravitate first into the hands of a trade guild and then of the state. "From time immemorial," Rostovtzeff observes in his *Social and Economic History of the Hellenistic World*, "a special craft of brewers had existed in Egypt, who certainly made a much better beverage than home-made beer." By the age of the Ptolemies, the manufacture of beer and its retail sale was controlled by the king. It was he who supplied barley to the brewers, took the profits and had the accounting done by his own agents.

The art of brewing was not confined to the Middle East. Long before the Chinese had made contact with the outside world, the drink they valued most was an exotic form of beer. It was made, at least as early as the 6th century B.C., from two parts of millet to one part of rice, heated in clay vessels over a controlled fire. Wheat flour was added to provide yeast, and aromatic plants for flavour. Since grapes were unknown to them, this may have been the liquor to which Confucius himself was addicted. "As to wine," it is related, "he knew no measure, though he did not fuddle himself."

Another Oriental people brewed by a more orthodox method. The prudent Armenians, Xenophon relates in the *Anabasis*, stored "great bowls of barley-wine" in underground buildings against the winter. "The actual grains of barley floated on top of the bowls, level with the brim, and in the bowls there were reeds of various sizes and without joints in them. When one was thirsty, one was meant to take a reed and suck the wine into one's mouth. It was a very strong wine, and, when one got used to it, it was a very pleasant drink." This, from a native of a wine-growing country, is a handsome enough tribute, surpassed only by that of Diodorus, who

sampled the *zythum* brewed at Pelusium (the Egyptian counterpart to Burton-on-Trent) and pronounced it not inferior to wine. Not so Aeschylus; in *The Suppliants* the King of Argos taunts the Egyptian herald:

We, too, have males  
In Argos, lusty-blooded men who drink  
Good wine, not brewed from barley.

The paragraphs devoted to beer in Pliny's *Natural History* are glumly censorious: "Alas, what wonderful ingenuity vice possesses! A method has actually been discovered for making even water intoxicating!" This reprehensible method was practised by the Celts: "there are a number of ways of making [this intoxicant] in the different provinces of Gaul and Spain and under different names, though the principle is the same." Pliny gives *caelia* and *cerea* as the names of Spanish beers, *cerevisia* "and several others" as the Gaulish varieties; he adds, inconsequently, "the froth of all these is used by women as a cosmetic." *Cerveza*, it may be observed, is the modern Spanish word for beer.

Among the Germans addiction to beer took on more dangerous forms. "Drinking bouts, lasting a day and a night", Tacitus remarks, "are not considered in any way disgraceful. Such quarrels as inevitably arise over the cups are seldom settled by mere hard words, more often by blows and wounds." These orgies, distressing to the moralist in Tacitus, were not unwelcome to the soldier-statesman: "You have only to indulge their intemperance by supplying all that they crave, and you will gain as easy a victory through their vices as through your own arms."

The Germans and Celts brewed their beer from malted or unmalted barley, wheat or oats, flavoured with bitter or aromatic plants. The astringent and preservative value of hops was still unknown. Its discovery is generally credited to the monasteries of Northern Gaul, already noted in the 6th and 7th centuries for their skill in brewing and hop-growing. Some etymological authorities, though not the Oxford Dictionary, are of the opinion that the monks gave the hopped product a name to distinguish it from the old unhopped ale. This was the vulgar Latin *biber*, a noun formed from the infinitive *bibere*, to drink. The word is alleged to have fathered the West Germanic *bior*. Apart from the oracular utterance of the dwarf Alvis in the *Elder Edda*, "it is called 'ale' among men, and among the gods, 'beer'", no distinction of meaning seems to be made in early Germanic literature. The common Old English word is *ealu*; though *beor* occurs, its use is rare, except in poetry. It did not become common until the





Douglas W



In mediaeval Britain the most accomplished brewers were the monks. "The ale of Canterbury in particular renowned for its virtues, and many thousands of gallons flowed annually down monkish throats in the Cathedral Priory." (Above) The brew-house of the Benedictine Priory of Christchurch, Canterbury. Though much restored and now put to very different uses this building was formerly the scene of great activity among the monastic brewers, one of whom, from an illuminated manuscript of the 14th century, is depicted (left) at his work. That was arduous work there is no doubt for in some places the daily allowance of beer was over four gallons a man.



*By courtesy of the Bodleian Library*

*In the 14th century the monasteries began to establish separate guest-houses to relieve the strain on their resources; these, with such inns as Chaucer's Tabard, were the forerunners of modern hotels. (Above) An inn of this period, the Golden Cross; a servant with a jug holds out a bowl to a passing knight. (Below) A mediaeval tapster carved in wood on a misericord in St Lawrence's Church, Ludlow*

*National Buildings Record*



English began to brew hopped beer early in the 15th century. There are records of hops being imported for brewing purposes in 1435.

Ale was already long established in Britain when the Anglo-Saxons arrived from Germany. According to R. G. Collingwood and J. N. L. Myres' *Roman Britain*, "large quantities of wheat were grown" before Caesar came and "barley was also grown and used for beer, the national drink of the Celts in every land." The invaders, though little influenced by the natives, at least shared their enthusiasm for ale, of which they drank three kinds—mild, clear, and Welsh—as well as mead or metheglyn. The earliest fragments of English literature describe convivial ale-drinkings at royal courts. *Beowulf* describes how the hero slays a monster which had been eating King Hrothgar's warriors. Much jollification naturally ensues. Hrothgar's queen, bidding the guests to be merry at the ale-drinking, offers the jewelled drinking-horn to the company in order of precedence. As it passes round, stories of brave deeds are told, "at times a minstrel sings, clear-voiced in Heorot", there is music and social merriment until at last the tables are cleared away and the hall is turned into a dormitory.

On occasions the Anglo-Saxons drank too much, perhaps as an antidote to the boredom of the long winter evenings. The Church made repeated attempts to check excesses. The first Christian king in England, Ethelbert of Kent, 560-616, made laws for the better ordering of alehouses. So did Ini, King of Wessex, in the following century. Tippling was by no means confined to the laity. St Gildas the Wise ordained that "if any monk through drinking too freely gets thick of speech, so that he cannot join in the psalmody, he is to be deprived of his supper." St David was made of sterner stuff: "Those who get drunk through ignorance must do penance fifteen days; if through negligence, forty days; if through contempt, three quarantains." The great West Saxon missionary, Winfrid, better known as St Boniface, "Apostle of the Germans", wrote in the 8th century to Cuthbert, Archbishop of Canterbury: "It is reported that in your dioceses the vice of drunkenness is too frequent. This is an evil peculiar to pagans, and to our race. Neither the Franks, nor the Gauls, nor the Lombards, nor the Romans, nor the Greeks commit it. Let us then repress this iniquity by decrees of synods and the prohibition of the Scriptures, if we are able." Another leading figure of the age, the Yorkshireman Alcuin, Abbot of St Martin at Tours, Latin poet, teacher and counsellor of Charlemagne,

advised his brethren at Jarrow to avoid *furtivas ebrietates*. The sin lay not in the use, but in the abuse of alcoholic liquor. Abstinence seems to have been rare. The Irish monk who drank only water for thirty years was admired, but his example was not followed with enthusiasm, at least among his countrymen. St Columban supplied ale in his monasteries, adjuring any brother who spilled it to drink water until he had made good the amount wasted. The rules against excess were applied strictly; when St Cronán worked a miracle to provide his guests with ale, the result was so successful that they all became intoxicated, and had to do forty days' penance on bread and water.

Many monks preferred wine to ale when they could get it. In a letter written from England to Joseph the Irishman at Tours, Alcuin lamented: "But woe is me. There is death in the pot, O man of God! The wine is gone from our wine-skins, and bitter beer rageth in our bellies." But, fortunately, "Uinter the physician has promised me two crates of wine, excellent and clear." Sedulius, an Irish contemporary at Liège, was utterly disconsolate; the monastery was "dark, fitter for the habitation of moles than of philosophers . . . abominable draughts . . . and worse than all, a really horrible beer." The greatest scholar of the 12th century, John of Salisbury, judged the relative merits of wine and beer more dispassionately. "I myself am a drinker of both," he remarked, "nor", he added tolerantly, "do I abhor anything that can make me drunk."

Ale, nevertheless, was the staple drink of Anglo-Saxon and Anglo-Norman monasticism. As a renegade monk was to remark many centuries later, "water, sole by itself, is not good for an Englysshe man"; and wine was too expensive. The lay brethren's statutes of Richmond Priory probably indicate the usual custom: "In countreys where wyne groweth not, or is not mayde, Let the Converses be contente to have wyne upon such Festyvalle days as they eate in ye Refectorye; on all other dayes let them use beare." And as the monasteries grew in size and numbers after the Conquest, brewing developed on a relatively large scale. The ale of Canterbury in particular was renowned for its virtues, and many thousands of gallons flowed annually down monkish throats in the Cathedral Priory. The average monk's capacity for absorbing malt liquor was nothing short of prodigious. The historian of *The Monastic Order in England* records that "the canons of St Paul's had each an allowance of thirty gallons of beer per week, and those





*Village ale-houses have always been simple places for a pint and a gossip, in contrast to the grander inns for travellers which by the 17th century had in many cases become sumptuous and comfortable.*  
 (Above) A Renaissance ale-house. (Below) *The White Hart at Scole in Norfolk, built in 1655*

*Picture Post Library*



of Waltham six bottles a week—each sufficient for ten men at a single meal.” Professor David Knowles adds, in all fairness, “doubtless we must reckon with the total absence of tea and coffee, of fresh fruit and vegetables during most of the year, and perhaps also of soup, but even so, these quantities are on a heroic scale.”

The size of the buildings used for brewing and malting corresponded to the demand. At Fountains Abbey the malt-house occupied the lower floor of an aisled building sixty feet long and fifty-seven feet wide, with a steeping-vat eighteen feet in diameter; the upper floor was probably used for brewing. At Waverley Abbey a smaller malt-house and brewhouse formed a group of buildings originally built in the 12th century and later much altered and enlarged. These are described by Sir Harold Brakspear in a volume published by the Surrey Archaeological Society. The malt-house was oblong, with a large vat projecting from the middle of one wall; the corner thus formed dovetailed into the square brewhouse. Barley was malted by being steeped in water for about three days in the vat, then piled in a heap until it began to germinate, when it was roasted in a kiln and ground at the Abbey mill. The malt so obtained was mashed in a tank at the brewhouse. The resulting wort or malt liquor was run into an underbath whence it flowed through a series of filters into the coolers, then to the fermenting vessels in the gyle-house, where it was transformed into ale. Pipes from the gyle-house conveyed the final product to casks in a storage cellar.

For all practical purposes the monks were innkeepers as well as brewers. Hospitality, one of the main obligations of religious houses, was expected if not exacted. At famous shrines pilgrims packed the monastic guest-houses and, in country where towns were far apart, travellers bent on less sanctified ends depended on the monasteries for food and shelter. The alms that guests were supposed to offer in return for their upkeep were often inadequate, above all when the guest was a royal personage travelling with a huge suite. King John's peregrinations gave nightmares to many a good abbot. At Bury St Edmunds, the prior grimly recorded, “he availed himself of the hospitality of St Edmund, which was attended with enormous expense, and upon his departure bestowed nothing upon the Saint, save thirteen pence sterling which he offered at mass.” Isabella, queen of Edward II, upset the monks of Canterbury by quartering a pack of hounds among them for two years. Enforced hospitality on this

scale became a burden to even the richest houses; and with the growing fashion for pilgrimages there were soon more tourists than there was room to accommodate them. By the 14th century the more frequented abbeys began to establish separate inns. Thus at Abingdon unwanted guests were politely directed to the “new hostelry”, leased out to private enterprise, across the road.

With three or four exceptions, the oldest surviving inns date from some time after 1400. But before then, as we know from *The Canterbury Tales*, there were already comfortable inns under commercial management. Harry Baily of the Tabard is the prototype of the best sort of modern innkeeper. His guests enjoyed good accommodation (“wel we weren lodged at the beste”), attendance from a staff of servants, a “souper at a certeyne prys” and a reckoning. After the Dissolution of the Monasteries in 1536-9, their guest-houses were secularized and many new inns sprang up. In 1577 William Harrison describes “great and sumptuous innes” capable of accommodating three hundred guests with ease. Forty years later Fynes Moryson roundly declares, “The World affoordes not such Innes as England hath, either for good and cheape entertainment after the Guests owne pleasure, or for humble attendance on passengers.” As more writers take up the tale, the evidence cuts both ways. Pepys counts himself lucky when he finds “good beds but lousy”, while Fielding complains that at good inns you paid extravagantly for good cheer, and at bad ones for nothing at all. William Kitchiner, the omniscient Regency physician, delivers *ex cathedra* judgment: “The Elegance and Magnificence of some English Inns and Taverns are equal to those of many Noblemen's Houses . . . but the generality of Taverns, in our opinion, are rather to be endured than enjoyed.” Dickens follows with vivid pictures of the vanishing glories of the coaching inn: the bustling servants, gargantuan dinners, blazing hearths, refulgent plate and napery. Thereafter the inn adapts itself to changing needs by assuming a variety of disguises: the Railway Hotel, the Hydro, the golf palace, the West End “Grand Babylon”. Whatever their pretensions they are all, even the Temperance Hotel, probably inns at common law. Nor is everything already standardized and impersonal; think of the imprint of such diverse personalities as Sir Harry Preston, John Fothergill, Rosa Lewis. In every period there were possibly more cabbages than roses, but by and large, the innkeepers of England are heirs to a great tradition.

# Explorers' Maps

## X. James Cook and the Mapping of the Pacific

by R. A. SKELTON

*This series of articles by the Superintendent of the Map Room at the British Museum presents, in regional order, some episodes in the history of exploration for which the evidence of maps is specially interesting or accessible. The text is to be read as a commentary on the maps and not as a connected history of discovery. In his present and two preceding articles Mr Skelton surveys the cartographic record of exploration in the Pacific from the 16th to the 18th century*

THE last Dutch voyage of exploration across the Pacific, that of Jacob Roggeveen who sailed in 1721 under the flag of the Dutch West India Company (and therefore by Cape Horn), had no more success than its predecessors in running down the illusory continent which Quiros thought he had found in 1606. Roggeveen followed the wake of earlier navigators, and his only important discovery were Easter Island and part of the Samoa group. Meanwhile other European peoples with oceanic ambitions were turning their eyes to the South Sea and its geographical problems and to the opportunity for commercial expansion offered by this "unknown area in which may be situated a continent greater than any of the other four."

Dampier's *New Voyage round the World*—a best-seller from its publication in 1697—had kindled his countrymen's interest in the Pacific; but English and French 'projecting' activity was slow in bearing fruit, and the South Sea promoters in 1711 "were able to float a company without floating a ship." Nor had the strategy of Pacific exploration, dictated by the steady wind systems, yet been learnt. A century and a quarter after Tasman's voyage of 1642-3, no other European ship had entered the South Pacific from the west; and, south of the Tropic of Capricorn, the map showed a vast empty space stretching from Tasman's west coast of New Zealand almost to Patagonia. Cartographers have always abhorred a vacuum, and they regarded this "perfect and absolute blank" with less favour than the Bellman's crew accorded his chart. Along its fringes they laid down the lands and islands sighted, in fact or imagination, by the explorers of two centuries—Staten Land, Juan Fernandez, "Davis Land", Easter Island, atolls of the Tuamotu Archipelago, the Tonga group, the west coast of New Zealand. These could be interpreted as sections of the coastline, or as outliers, of the

Southern Continent whose existence had to be postulated to counterbalance the land-masses of the Northern Hemisphere and to hold the earth in equipoise (Fig. 1).

Such theoretical arguments encouraged projects for the commercial and political exploitation of the South Sea. The possibility of extensive inhabited lands, lying in temperate latitudes and unknown to Europeans, could not be ignored by the rival mercantile powers of England and France. The British 'siege' of Spain's *mare clausum* in the Pacific opened with authorized raids on the Spanish trade routes and ports, culminating in the spectacular voyage of Anson in 1740-44. It was more systematically developed, in the second half of the century, by projects for establishing trading stations in the East Indies, by political manoeuvring for the naval bases necessary to the exploration of the Pacific from the east, and by a series of expeditions which eventually traversed the ocean throughout its longitudinal width and from the Antarctic to the Arctic Circle.

The first voyage promoted by the British Admiralty after the close of the Seven Years' War in 1763 had similar objectives to those of Drake in the *Golden Hind* in 1577. The Lords Commissioners had "reason to believe that Lands and Islands of great extent hitherto unvisited by any European Power may be found in the Atlantick Ocean between the Cape of Good Hope and the Magellanick Strait, within Latitudes convenient for Navigation, and in climates adapted to the produce of Commodities usefull in Commerce," and "that a Passage might be found between the Latitude of 38° and 54° [N] from that coast [Drake's New Albion, or California] into Hudson's Bay." Commodore Byron, sailing in 1764 in the frigate *Dolphin*, was accordingly to discover Terra Australis, by a cruise between the Falkland Islands and the Cape of Good Hope, and the North-West





All illustrations, except one, from the British Museum

(Fig. 1: above) This map published in 1763 illustrates the hypothetical southern lands believed by geographers to counterbalance those of the northern hemisphere, which are superimposed and shaded. With the coast of the Southern Continent, "according to the New Plan", are associated the lands or ice sighted by navigators from Vespucci to Bouvet. (Fig. 2: opposite, top) Bougainville's chart, showing his track in 1768, westward from Tahiti, and his landfalls in the New Hebrides ("Grandes Cyclades") and Solomon Islands ("Baye Choiseul"). On the equator, some  $25^{\circ}$  east of their true position, the chart lays down the "Isles Salomon"—"whose existence and position are doubtful". (Fig. 3: opposite, bottom) This drawing by George Pinnock, a midshipman in the *Dolphin*, depicts Captain Wallis's ship lying in Port Royal (Matavai Bay), Tahiti, in June-July 1767



# APLAN of KING GEORGES ISLAND OR OTAHEITE

By LIEUTENANT I COOK *Discovered by Cap<sup>t</sup> Wallis the 19<sup>th</sup> June 1767.*

Point Venus Lat 17. 24 S. Long 149. 50 W from Greenwich

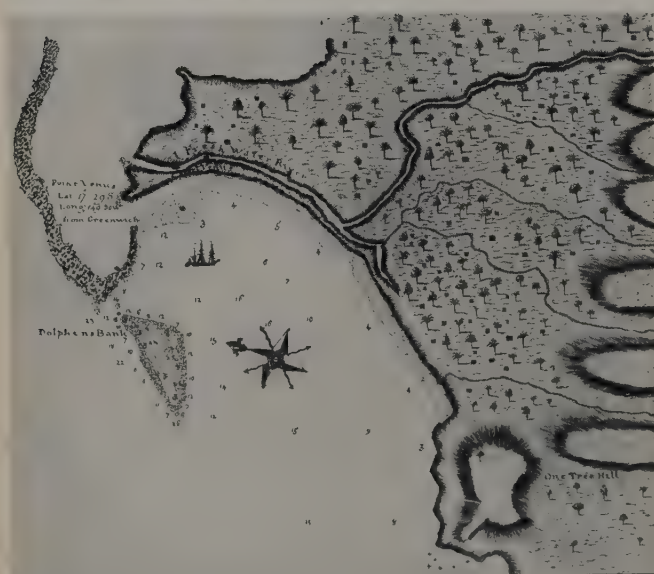
A Scale of Miles

Motu Ahoua

OPOOREONOO

TARREBOO

Point of View



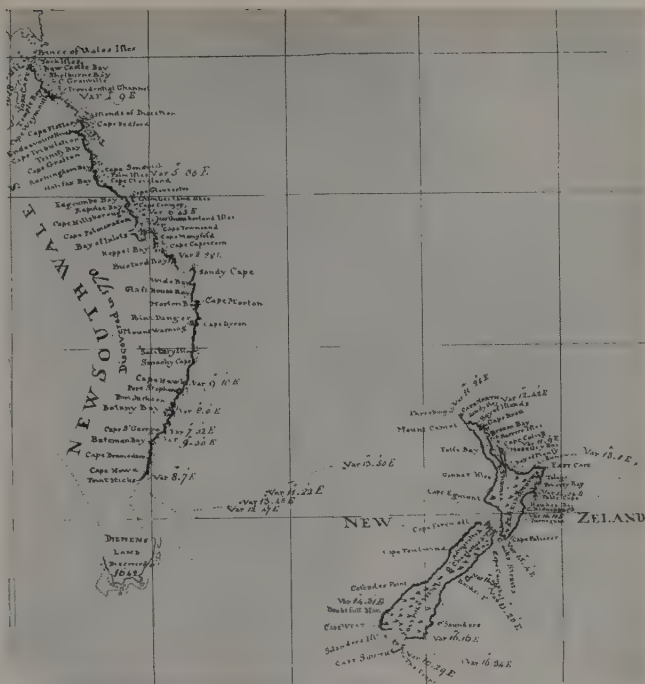
APLAN of ROYAL MATAVAI BAY in GEORGES ISLAND

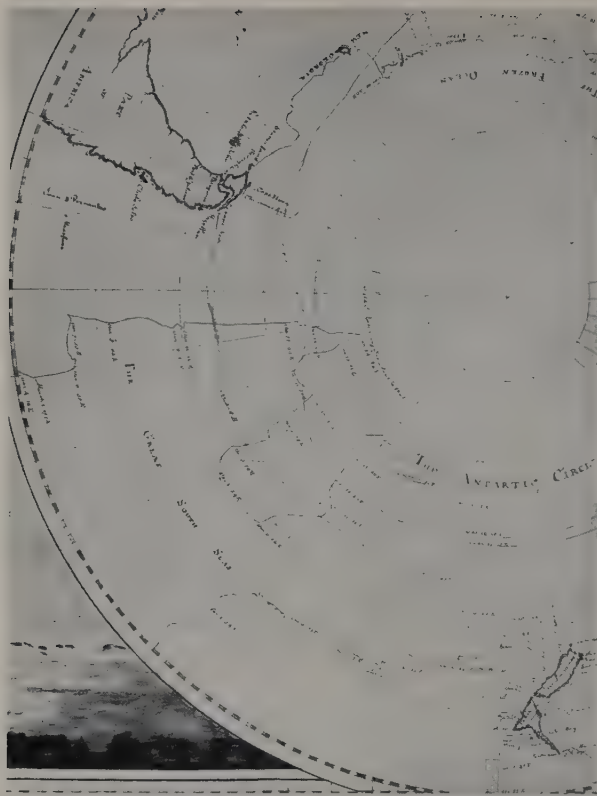
A Scale of One Mile

(Fig. 4: above) Cook's chart of Tahiti, laid down from his journey round the island in May-June 1769. (Fig. 5: left) Cook's chart of his anchorage in Matavai Bay, showing Fort Venus where the astronomical observations of the transit of the planet Venus were made in June 1769



(Fig. 6: right) Cook's charting of New Zealand and the east coast of Australia, October 1769-August 1770, displays the remarkable accuracy of his outline and his general correctness in latitude. The track of the Endeavour illustrates the pertinacity with which her commander "kept the coast aboard"; and on shooting his ship through the Great Barrier Reef for the second time he admitted that "I have engaged more among the Islands and shoals upon this coast than may be thought with prudence I ought to have done with a single ship . . . but if I had not we should not have been able to give any better account of the one half of it than if we had never seen it." (Fig. 7: below) Detail of Cook's chart of the coast of "New South Wales", showing the reef on which the Endeavour struck in June 1770, Endeavour River where she was careened and repaired, and her perilous passage through the reef in August





(Fig. 8) Part of a general chart of Cook's second voyage, drawn by one of his officers, with the track of the *Resolution* in the South Pacific and the Antarctic, 1773-4

Passage by its Pacific entrance. Byron passed the Magellan Strait and, showing little respect for his orders and an unlucky aptitude for missing islands, crossed the Pacific to the Ladrões by a course, north of the Tropic, which added little to knowledge. In 1767-8 the *Dolphin* made her second circumnavigation, this time under Captain Samuel Wallis, who sailed in company with the *Swallow*, Captain Philip Carteret. Wallis's instructions confined him to the search for Terra Australis "in the South Hemisphere between Cape Horn and New Zealand"; after entering the Pacific by the Magellan Strait or Cape Horn, he was to "stretch to the Westward about One Hundred or One Hundred and Twenty degrees of Longitude from Cape Horn, losing as little Southing as possible." The two ships parted company on debouching from the Strait. Wallis's orders had taken little account

of the "brave west winds", and his only considerable discovery—a significant one—was that of Tahiti (Fig. 3). Carteret, in an ill-found ship, made a spirited voyage, in the course of which he crossed the Pacific in a higher latitude than any earlier navigator, reached the Solomon Islands (for the first time since their discovery by Mendaña exactly 200 years before), and found the strait—overlooked by Dampier—between New Britain and New Ireland. A French expedition under Louis Antoine de Bougainville, crossing the Pacific in 1768, penetrated into the unexplored triangle between the New Hebrides, the Australian coast, and the Solomons (Fig. 2). After touching at Tahiti and Samoa, Bougainville sailed resolutely westward (rejecting the safer north-westerly course of all previous voyages) to the New Hebrides and onward till he found the breakers of the Great Barrier Reef under his bows. Thus narrowly failing to discover the east coast of Australia, he hauled off north and passed through the Solomons, which he (like Carteret) did not identify, on his way to Batavia.

Both Carteret and Bougainville had sailed over ocean where contemporary maps laid down the solid land of a continent; but there was still ample room for a great land-mass extending along the south of the Atlantic and Indian Oceans and (in the South Sea) almost as far north as the Tropic (Fig. 1). The main question remained unanswered, and the Admiralty's choice of the Commander who was to answer it was unusual but illuminating. In place of the senior naval officers who had led the earlier British expeditions, they pitched upon a warrant officer whose only previous command had been a 60-ton brig employed on coastal survey—but who was already the most accomplished surveyor of his day in the British, and perhaps any, naval service. James Cook, Master R.N. and reputed "a good mathematician, and very expert in his business," was in 1768 selected to command H.M. Bark *Endeavour*, sent out by the Admiralty to carry the Royal Society's scientists to Tahiti, where the transit of the planet Venus across the sun was to be

observed. Cook's additional secret instructions required him to search for the continent which "there is reason to imagine . . . may be found to the Southward of the Tract lately made by Capt<sup>n</sup> Wallis . . . or of the Tract of any former Navigators in Pursuits of the like kind." Earlier explorers in the South Pacific had been frustrated by deficiencies in their knowledge and technical equipment. It had not been appreciated that the westerly winds of the forties closed the higher latitudes to sailing ships entering from the east; and Cook's own first voyage was directed by Cape Horn. Determination of longitude by dead reckoning, on an east-west course across the great width of this ocean, was extremely fallible in fixing the position of landfalls, which were difficult to rediscover or identify. When Cook sighted New Zealand in October 1769, his dead reckoning placed him about four degrees east of his true longitude; yet Cook possessed, in the tables of the newly founded *Nautical Almanac* and in the chronometers which he carried on his second and third voyages, means for determining longitude greatly superior to those of his predecessors. Finally, the science of hydrography was little developed, and the charts produced by earlier voyagers were unreliable guides to those who followed. In 1768 Cook had just spent four years on a survey of the coasts of Newfoundland, and in his view the explorer's

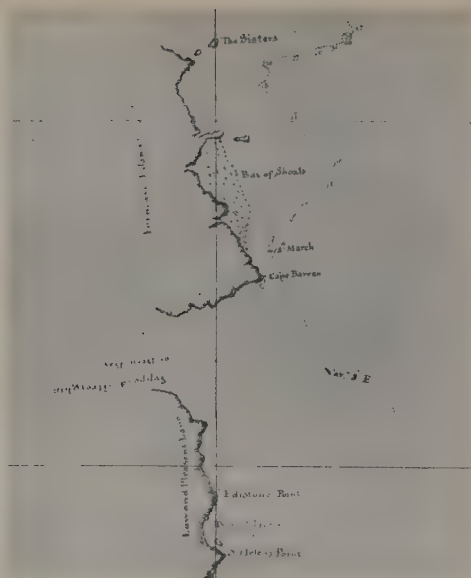
task was to bring home a trustworthy chart of his discoveries.

The construction of charts was a neglected discipline in the seaman's education during the 18th century, particularly in the British Navy. Anson had in 1748 urged that the complement of men-of-war on long cruises should include "a person, who with the character of an engineer, and the skill and talents necessary to that profession, should be employed in drawing such Coasts, and planning such Harbours, as the Ship should touch at," and he complained "how very imperfect many of our accounts of distant countries are rendered, by the relaters being unskilled in drawing, and in the general principles of surveying," without which "navigation is at a full stand." Yet in 1770 Cook could still write of "the few [seamen] I have known who are capable of drawing a Chart or Sketch of a sea coast"; and not until after the establishment of the Hydrographic Office of the Admiralty in 1795 was any regular provision made for the compilation and correction of charts and their issue to H.M. ships. But Cook's survey of Newfoundland had been made by trigonometrical methods adapted from those employed by military engineers in land survey, and he approached his task of discovery in the spirit of a hydrographer. "The world", he wrote, "will hardly admit of an excuse for a man leaving a coast un-

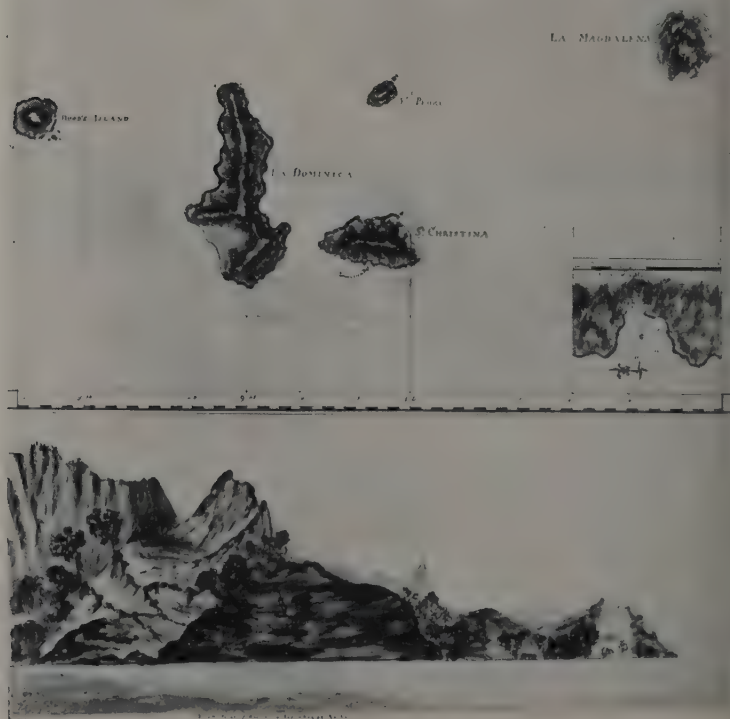
(Fig. 9) *The Resolution among "ice islands" in the Antarctic, January 1773; taken from a drawing by William Hodges. The boat's crew are breaking off blocks of ice to be melted for drinking water*







(Fig. 10: left) Chart of the north-east coast of Van Diemen's Land (Tasmania), showing the Adventure's track in February 1773. Blown offshore, Captain Furneaux failed to discover the strait between Tasmania and the mainland (marked on the chart as "Suppos'd Streights or Deep Bay") and, on rejoining Cook, expressed the opinion "that there is no straits between New Holland and Van Diemen's Land, but a very deep bay". (Fig. 11: below) Chart of the Marquesas, drawn in April 1774, with the Resolution's track and an inset chart and view of her anchorage in Resolution Bay. (Fig. 12: opposite) Chart and view of South Georgia, with the track of the Resolution. After coasting this island and part of the South Sandwich group in January 1775, Cook was impressed by "the inexpressibly horrid aspect of the country: a country doomed by nature . . . to lie buried in everlasting snow and ice"; and concluded that "the greatest part of this southern continent (supposing there is one) must lie within the polar circle"



explored [i.e. uncharted] he has once discovered." Chart and journal he considered as complementary—and equally important—records of a voyage and, unlike Wallis who had (in common with most naval captains of his time) left the surveying to his master, Cook was evidently himself responsible for most of the chartwork on his first voyage and for the close supervision of that of his officers on the later voyages. His three expeditions not only revealed the geography of the Pacific but also set new standards in the survey and hydrography of unknown coasts.

The *Endeavour*, built for the Whitby coal trade in which Cook had learnt his seamanship, was well adapted for coastal navigation in strange waters; a roomy ship of strong construction and shallow draught, she would "take the ground well" and her commander, while engaged on survey, could "keep the coast aboard" without fear. In August 1768 she sailed from Plymouth with a complement of eighty-four and a 'suite' of scientists and their servants numbering eleven. Earlier cap-

tains had preferred the passage by Magellan Strait, where antiscorbutic plants could be found; but Cook, noting the difficulties experienced by Wallis in his four months' passage of the Strait and confident in his resources for the prevention of scurvy, chose the Cape Horn route. At Tahiti he remained three months for the astronomical observations and for refitting (Figs. 4, 5), and then sailed south and west to discover the east coast of New Zealand. New Zealand was circumnavigated and 2400 miles of coast were charted in six months (October 1769–March 1770; Fig. 6). Reaching across the Tasman Sea, Cook made his second great discovery, that of the east coast of New Holland, which he traversed from April to August 1770, sailing "360 Leagues without having a Man out of the cheans heaving the Lead . . . a circumstance that I dare say never happened to any ship before." Although the *Endeavour* was three times near disaster among the reefs, Cook's charting of 2000 miles of coast in four months produced an astonish-







(Fig. 13: left) The coasts of Alaska and Berin, Strait, from a chart drawn by Cook. This chart was enclosed in the letter dated October 20, 1778, which Cook wrote to the Secretary of the Admiralty from Unalaska in the Aleutian Islands and sent home by way of Russia; it was received in London on March 6, 1780, a year after Cook's death. The track of the Resolution and Discovery is shown from Prince William Sound and Cook Inlet (May-June 1778), west to the Aleutians and then north through Bering Strait. On the American coast he reached  $70^{\circ} 44' N$  (August 17, 1778) before being stopped by ice and returning south to Unalaska (Fig. 14: below) Drawing by John Webber, the official artist of Cook's third voyage, showing the Resolution and Discovery lying in Prince William Sound, May 1778. By now Cook, searching for a sea passage into the Atlantic, had found the American coast "to trend very much to the west". He sent two boat parties to examine the arms of the Sound and their report and "the circumstance . . . of the flood tide entering the Sound from the south rendered the existence of a passage this way very doubtful".

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ingly good outline (Figs. 6, 7). On August 17, 1770, the *Endeavour* was being driven towards the coral reef, "not above 80 or 100 yards from the breakers . . . so that", wrote Cook, "between us and destruction was only . . . the breadth of one wave"—yet the three men taking observations for longitude remained at their instruments, and Green the astronomer commented "these observations were very good." Cook made his way to Batavia by Torres Strait, which was thus passed for the first time by a European ship since Torres and Prado in 1606.

Reflecting on this voyage, Cook outlined at the end of his *Journal* the plan to be followed in examining the diminished but still immense expanse in which *Terra Australis* might lie. He recommended "that the most feasible Method of making further discoveries in the South Sea is [from the Cape of Good Hope] to enter it by the way of New Zealand . . . and . . . with the prevailing Westerly winds, run to the Eastward in as high a Latitude as you please and . . . if after meeting with no Continent & you had other Objects in View, than haul to the northward . . . after which proceed with the trade wind back to the Westward." This was the pattern for his second expedition (July 1772–July 1775), in the *Resolution*, another Whitby bark, with the *Adventure*, Captain Tobias Furneaux, as consort.

In the course of this voyage (Fig. 8) he three times crossed the Antarctic Circle (never before passed by a European ship; Fig. 9), reaching the high latitude of  $71^{\circ} 10' S$ ; he demonstrated that no continental land lay north of  $60^{\circ} S$  in the Indian or Atlantic Oceans; and he made three extensive cruises in the South Pacific which satisfied him "that the greatest part of this southern continent (supposing there is one) must lie within the polar circle." The "savage and terrible" aspect of South Georgia (Fig. 12) indeed led him to affirm that "to judge of the bulk by the sample, [the continent] would not be worth the discovery." The principal surveys of this voyage were those of Tasmania (visited by Furneaux in the *Adventure* while separated from Cook), the Friendly Islands, the Marquesas, the New Hebrides, and New Caledonia (Figs. 10, 11).

In July 1776 Cook sailed on his last voyage, again in the *Resolution*, this time accompanied by the *Discovery*, Captain Charles Clerke. His objective was that defined in the second part of Byron's instructions, "to find out a Northern Passage by sea from the Pacific to the Atlantic Ocean." Taking once more the east-

ward route by the Cape of Good Hope, he touched at Tasmania (which, relying on Furneaux's report and chart of 1773, he took to be part of the Australian coast; Fig. 10), New Zealand and Tahiti. At the end of 1777 he sailed north to discover Hawaii and, early in 1778, north-east to the Pacific coast of North America. Running along this in search of a strait and charting as he went, he sailed from  $44\frac{1}{2}^{\circ} N$  through Bering Strait, both shores of which were examined, and along the Alaskan coast to his farthest north in  $70^{\circ} 44'$  (Fig. 13). During this part of the voyage, 3000 miles of coast were surveyed and charted in little over four months. Returning south to refit, Cook was killed by natives of Hawaii on February 14, 1779.

When Cook's work was finished, only a handful of Polynesian islands remained undiscovered (the Gambier group, the northern Marquesas, and isolated islands of the Cook group and Tuamotus). His voyages mark an epoch no less in the mapping of the world than in its exploration. The accurate methods of coastal survey, by triangulation from shore stations, which he had applied in Newfoundland, were not possible in the Pacific, where the charts had generally to be drawn by a continuous running survey from the ship, with compass bearings or sextant angles taken on shore features, and a good deal of mast-head sketching. Cook's hydrographic work in the Pacific, although it stood the test of time, was necessarily a compromise between his standards and his opportunities. While making a sketch survey in the New Hebrides in 1774, he commented: "The word survey is not to be understood here in its literal sense; surveying a place, according to my idea, is taking a Geometrical plan of it, in which every place is to have its true situation, which cannot be done in a work of this Kind." But this very consciousness that the finished work fell short of his standards itself distinguishes him from his predecessors. In a rare moment of self-analysis, he wrote of himself as one "whose ambition leads me not only farther than any man has been before me, but as far as I think it possible for man to go," and he described "the pleasure which naturally results to a Man from being the first discoverer, even was it nothing more than sands and Shoals." He did not indeed lack the bold spirit of earlier navigators, but he added to it qualities of leadership and scientific method which they lacked. The "good mathematician, very expert in his business" drew the modern map of the Pacific.